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Mauro, Charles *et al.*

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**APPLICATION ELEMENTS**

See MPEP chapter 600 concerning utility patent application contents.

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-Statement Regarding Fed sponsored R&D  
-Reference to Microfiche Appendix  
-Background of the Invention  
-Brief Summary of the Invention  
-Brief Description of the Drawings *(if filed)*  
-Detailed Description of the Invention (including drawings, *if filed*)  
-Claim(s)  
-Abstract of the Disclosure
3. Drawing(s) (35 USC 113) [Total Sheets 67]
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# COMPUTER TRADING SYSTEM, METHOD, AND INTERFACE

## FIELD OF THE INVENTION

5           This invention relates to computer-aided trading of financial instruments, and preferably to trading of securities over the Internet.

## BACKGROUND OF THE INVENTION

10           In the United States, the trading of securities is closely regulated under the Securities Exchange Act of 1934, 15 U.S.C. §§ 78a-78mm. The term "security" is defined in 15 U.S.C. § 78c(a)(10) as "any note, stock, treasury stock, bond, debenture, certificate of interest or participation in any profit-sharing agreement or in any oil, gas, or other mineral royalty or lease, any collateral-trust certificate, preorganization certificate or subscription, transferable share, investment contract, voting-trust certificate, certificate of deposit, for a security, any  
15   put, call, straddle, option, or privilege on any security, certificate of deposit, or group or index of securities (including any interest therein or based on the value thereof), or any put, call, straddle, option, or privilege entered into on a national securities exchange relating to foreign currency, or in general, any instrument commonly known as a 'security'; or any certificate of interest or participation in, temporary or interim certificate for, or warrant or right to subscribe  
20   to or purchase, any of the foregoing . . . but shall not include currency or any note draft, bill of exchange, or banker's acceptance which has a maturity at the time of issuance of not exceeding nine months, exclusive of days of grace, or any renewal thereof the maturity of which is likewise limited." Stocks are specific instances of securities. Although the preferred embodiment is primarily concerned with computerized stock trading, it is fully applicable to  
25   trading of any securities.

Securities are conventionally traded on exchanges. As set forth in 15 U.S.C. § 78c(a)(1), "the term 'exchange' means any organization, association, or group of persons, whether incorporated or unincorporated, which constitutes, maintains, or provides a market place or facilities for bringing together purchasers and sellers of securities or for otherwise performing with respect to securities the functions commonly performed by a stock exchange as that term is generally understood, and includes the market place and the market facilities maintained by such exchange". Well known exchanges include, for example, the New York Stock Exchange, the American Stock Exchange and NASDAQ. Such known exchanges are referred to herein as national exchanges.

Usually securities are traded through brokers and dealers, which frequently use an on-line system to receive orders and facilitate trades. As set forth in 17 C.F.R. § 240.17a-23(b)(2) a broker/dealer trading system is "any facility that provides a mechanism, automated in full or in part, for:

- (i) Collecting, receiving, disseminating, or displaying system orders [i.e., orders to purchase or sell a security]; and
- (ii) Matching, crossing, or executing system orders, or otherwise facilitating agreement to the basic terms of a purchase or sale of a security between system participants [i.e., the users of the trading system], or between a system participant and the system sponsor, through use of the system or through the system sponsor [i.e., the entity controlling the broker/dealer system]."

In this patent application, the terms "security", "exchange" and "broker/dealer trading system", are used as defined above.

Systems are known for trading securities over the Internet on the national exchanges at the prices quoted on those exchanges. These systems support trading during normal business

hours of the national exchanges, which may not be convenient for many users, such as many individuals who would prefer to trade from home after the close of the exchanges. The existing systems, however, do not support active trading after the closing hours of the exchanges. Thus, there is a need for a system that permits the users to execute trades after  
5 normal market hours (after-hours trades) without using an established exchange. And, there is a need for a system that permits users to trade with each other ("user-to-user trading") without involving an exchange.

The presently available systems are directed toward the presentation of numerically formatted information. Moreover, these systems do not provide a visualization of the status of  
10 securities as they are traded so as to enable users to gain an essentially immediate and accurate impression of a stock's status, direction of movement, and rate of change, without having to resort to complex mental calculations and holding such calculations in short-term memory. But humans are unsuited to processing numeric information quickly and accurately, and performing mental calculations under stressful conditions places very high cognitive workloads  
15 on humans. In addition to being poor processors of numeric information, humans also tend to have very weak short-term memories. Requiring users to perform mental calculations and then hold the results of those calculations in short-term memory while performing even more calculations is unnecessarily difficult and demanding, especially when users are placed under the additional stress of having to decide whether to buy, sell or hold a stock. Traditional on-  
20 line trading systems further compound the problem by requiring users to navigate from page to page within the site to gather news and information on their positions, their profit and loss, their open orders, their current positions, and their financial account information. Each time a user moves to a new screen he is forced to store values, which are critical to informed trade-decision-making, in short-term memory.



Another deficiency in current Internet trading systems is that users cannot obtain a real-time quotation on a particular stock (or a portfolio of stocks) without manually requesting a specific quotation from the trading system server, often by typing it every time they need a quote, or hitting "refresh." That is, users of current Internet trading systems cannot simply  
5 access the trading system and receive a continuously updated display of real-time quotes for a particular stock or a portfolio of stocks. The need to type in a stock symbol every time a quote is desired further contributes to the inefficiency of the existing systems.

Accordingly, there is a need for an efficient Internet-based trading system which provides improved human interaction and after-hours trading.

#### SUMMARY OF THE INVENTION

The system and method of the preferred embodiment supports trading of securities over the Internet both on national exchanges and outside the national exchanges. The preferred embodiment also supports an improved human interface and a continuous display of  
15 real-time stock quotes on the user's computer screen.

In the preferred embodiment, the users are subscribers to a securities trading service offered over the Internet. Each subscriber to this service is simultaneously connected from his own computer to a first system which provides user-to-user trading capabilities and to a second system which is a broker/dealer system of his/her choices. By user-to-user trading we  
20 mean a trade that is made between two users of the system. The system providing the user-to-user trading services includes a hierarchical network of replicated servers supporting replicated databases. The broker/dealer system is a server-based system such as any one of the systems currently used by broker/dealers to maintain their clients' accounts. The use of these broker/dealer systems in the present invention is conventional except for their interaction with

the user-to-user trading system. In particular, each broker/dealer server communicates with the user's computer as well as with the root server of the user-to-user system when the user's account is affected, and the user-to-user system provides real-time continuously updated stock information and facilitates user-to-user trades that have been approved by the broker/dealer  
5 systems with which it interacts.

Users of the preferred system can trade securities with other users of the system after national market trading hours. As part of this user-to-user trading, a user can accept a buy or sell offer at the terms offered or he can initiate a counteroffer and negotiate a trade. This ability to have users trade and negotiate trades among themselves creates a market within the  
10 subject system, referred to herein as "after-hours market" or "Nite Market," but which is capable being operated 24 hours per day, 7 days per week.

The preferred embodiment provides an ergonomic graphical user interface (GUI) that includes at least some of the following functional benefits in comparison with existing on-line consumer trading systems: (1) faster access to critical information; (2) faster execution of  
15 primary trading functions; (3) better decision making during the trading process; (4) fewer undetected critical errors; (5) easier correction of detected errors; (6) faster and more reliable problem resolution; (7) improved use of each user/trader's desktop workspace; (8) easier customization and configuration based on user experience; (9) easier and faster initial setup of each user's securities on the system; and (10) faster and more stable acquisition of trading  
20 skills. The GUI of the preferred embodiment graphically displays a "visual quote" that shows at a glance the condition of the market in a security and the user's relative position based on the status of the security in the marketplace. This visual quote provides a graphic representation of the important variables that the user needs to make accurate trading decisions without interpreting traditional numeric quotes. Further, the GUI of the preferred

embodiment, unlike other on-line trading interfaces, does not require users to page to a separate screen to view their current and open positions in a security, thereby reducing errors and short-term memory demands on the user and improving the quality of on-line trading. The preferred embodiment also provides speed-trading functions as well as visual feedback that

5 tracks the progress of the security trading process.

Although the preferred embodiment described below relates to computerized stock trading, it is readily applicable to trading of any securities and, in addition, a person skilled in the art will readily appreciate how the disclosed technology can be used for other forms of computerized trading (e.g., trading airline tickets, automobiles, or theater tickets).

#### BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, features and advantages of the invention will be more readily apparent from the following detailed description of a preferred embodiment of the invention in which:

**FIG. 1** illustrates a communications system of the preferred embodiment.

**FIG. 2** illustrates an alternative embodiment.

**FIG. 3** is a flow diagram illustrating the operation of the preferred system for the user-to-user trades.

**FIG. 4** illustrates how the alternative embodiment illustrated in **FIG. 2** enables the

20 real-time updating and transmission of information.

**FIG. 5** illustrates a graphical user interface (GUI) of the preferred embodiment.

**FIG. 6** depicts a visual quote and order book display.

**FIG. 7** depicts an open orders display.

**FIG. 8** depicts a current positions display.

**FIG. 9** depicts a financial summary display.

**FIG. 10** is a news and information display.

**FIG. 11** is a trade ticket display.

**FIG. 12** is a stock summary display.

5      **FIG. 13** is a multiple pricing maps display.

**FIG. 14** depicts a real-time chart of stock activity.

**FIG. 15** is a function button display.

**FIG. 16** is an illustration of four different views available through expanding and shrinking the master trade screen.

10      **FIG. 17** is a flow diagram illustrating software that enables a user to obtain and install the graphical user interface (GUI) software of the preferred embodiment and open a new account.

**FIG. 18** is a flow diagram illustrating logging onto the system and visualizing the stock market in the alternate embodiment described in **FIG. 3**.

15      **FIG. 19** is a flow diagram illustrating software of the preferred embodiment which enables a user to view trading and account information on one screen and facilitates fast and accurate trading of stocks.

**FIG. 20** is a flow diagram illustrating software of the preferred embodiment which enables a user to visualize the detailed market in other stocks with one action.

20      **FIG. 21** is a flow diagram illustrating software of the preferred embodiment which enables a user to execute a buy order in a stock.

**FIG. 22** is a flow diagram illustrating software which enables a user to execute a sell order in a stock.

**FIG. 23** is a flow diagram illustrating software which enables a user to execute a change order in a stock purchase already entered into the system.

**FIG. 24** is a flow diagram illustrating software which enables a user to execute a cancel order for a stock purchase already entered into the system.

5       **FIG. 25** is a flow diagram illustrating the computer steps by which a user negotiates for a better price in a stock shown in the after-hours stock market of the preferred embodiment.

**FIG. 26** is a flow diagram illustrating software supporting the context-sensitive "Help" function of the preferred embodiment.

10       **FIG. 27** is a flow diagram illustrating software which enables a user to view several instances of the order books of the after-hours market on one screen.

**FIG. 28** is a flow diagram illustrating the computer steps required for compressing the view of the master trade screen of the GUI of the preferred embodiment.

15       **FIG. 29** is a flow diagram illustrating the computer steps required to expand the display of the GUI of the preferred embodiment to obtain a full view of the master trade screen.

**FIG. 30** is a flow diagram illustrating the software of the preferred embodiment for alerting a user to movements on stocks according to user-defined preferences.

20       **FIG. 31** is a flow diagram illustrating how the preferred embodiment enables a user to visualize the general status of stocks and related positions via an analog graphic display.

**FIG. 32** is a flow diagram illustrating how the preferred embodiment enables a user to visualize the best price in a security from an analog graphic display of alternate markets.

**FIG. 33** is a flow diagram illustrating the operation of the news gathering and distribution system of the preferred embodiment.

**FIG. 34** is a flow diagram illustrating software which enables a user to view the status of his open orders in a stock.

**FIG. 35** is a flow diagram of software which enables a user to view the status of positions and profit and loss information (P&L).

5        **FIG. 36** is a flow diagram illustrating software which enables a user to view the status of his account history.

**FIG. 37** is a flow diagram illustrating software which enables a user to view the status of his account balances.

10       **FIG. 38** is a flow diagram illustrating software which enables a user to receive and view email messages for account activity functions.

**FIG. 39** is a flow diagram illustrating software which enables a user to view and select the best price for the same stock sold in several markets.

15       **FIG. 40** is a flow diagram illustrating software which enables a user to view the market in a stock by accessing the visual quote and providing visual display of stock performance.

**FIG. 41** is a "Set defaults" display for the user-to-user negotiation mechanism of the preferred embodiment.

**FIG. 42** is a negotiations screen.

**FIG. 43** illustrates how the negotiation screen fits into the master trade screen.

20       **FIG. 44** illustrates how a user adjusts the values in his counteroffer.

**FIG. 45** illustrates how the application displays the potential effect of a user's counteroffer.

**FIG. 46** illustrates how an offering trader responds to a user's counteroffer.

**FIG. 47** illustrates how a user makes an offer to sell and then receives buy counteroffers.

**FIG. 48** illustrates how the preferred embodiment enables a user to conduct more than one in-coming negotiation and more than one out-going negotiation simultaneously.

5       **FIGS. 48A** and **48B** show a flow diagram illustrating how the system enables one user to negotiate with another user.

**FIG. 49** is a "Most viewed stocks" display.

**FIG. 50** is a fully compressed view of the GUI of the application (see **FIG. 16**).

**FIG. 51** shows a "Quick Quote" display.

10       **FIG. 52** shows a "Stock alert set up" display.

**FIG. 53** shows a connection status indication display.

**FIG. 54** shows a compressed spread display.

**FIG. 55** shows an email display.

**FIG. 56** shows a "Final Verification" screen.

15       **FIG. 57** shows an analog graphic display for viewing the price of a stock on several markets at one time.

**FIG. 57A** is a "Most Active Stocks" display.

**FIG. 57B** shows how the most viewed stocks display shown in **FIG. 49** is displayed in the same screen as the Order book display, chart display, and most active stocks display.

20       **FIG. 57C** shows a multi-screen view created by a "Peel off display" function.

**FIG. 58** shows an applet version of the display of a real-time chart of the stock activity shown in **FIG. 15**.

**FIG. 59** shows an applet version of the most active stocks display shown in **FIG. 57A**.

**FIG. 60** shows an applet version of the most viewed stocks display shown in **FIG. 57B**.

**FIG. 61** shows an applet version of the order book display shown in **FIG. 6**.

**FIG. 62** shows an applet version of the news display shown in **FIG. 10**.

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#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

As noted, the preferred embodiment supports both traditional on-line securities trading on national exchanges and on-line user-to-user trading outside the national exchanges. The preferred embodiment employs both a system specifically developed for such trading  
10 (sometimes simply referred to as the preferred system) and one or more broker/dealer computers of the type customarily employed for computerized on-line trading.

In the preferred embodiment, each of a multiplicity of users' workstations is simultaneously connected via the Internet to one of a plurality of broker/dealer computers and to a user-to-user trading system. Each broker's computer stores the account data and similar  
15 information customarily stored at a broker's server computer for the broker's clients. The preferred system communicates with each broker's server computer and in addition provides real-time updates for stock quotes both as a part of the service supporting day trading on national exchanges and as part of the service supporting user-to-user trading. For the user-to-user trading service the system maintains real-time data reflecting buy and sell orders for the  
20 supported securities, and is capable of displaying the same information for national exchanges if that data is provided by the exchange(s). This data reflecting users' orders to buy and sell for each security is referred to as the "order book" for a security. The users interested in a given security receive at their workstations real-time displays of the order book for that security. In one embodiment of the invention, such order book information is selectively



provided to users on a subscription basis. It is also capable of being displayed (free, or for a fee) by Internet portals such as Yahoo!, Altavista, etc.

Users' workstations, which are typically ordinary personal computers or other computer devices with sufficient processing and storage capabilities, store application software (also referred to hereinafter simply as "application") that supports a connection both to the user-to-user trading system and to the broker/dealer computer so as to display to the user the information available from both sources. As noted, the user's account and similar data is provided by the broker/dealer's server and the user-to-user trading data as well as real-time quotes are provided by the trading system. The application on the user's workstation preferably employs a user interface combining data provided from both sources.

**FIG. 1** illustrates a communications system of the preferred embodiment. The system comprises a plurality of work-stations 10, each of which is connected via a communications network 12 to one of a plurality of broker/dealer servers and databases 42 and each of which is connected via a communications network 15 to a hierarchical server and database structure 55. The hierarchical structure comprises a root server and master database 50, intermediate servers and databases 40, replica servers and databases 30, and a load balancer 20 interconnected by communications networks 34, 36 and 46. In addition, the broker/dealer servers and databases 42 are connected to the root server and master database 50 via communication networks 41, 44. The intermediate servers and databases 40 may not be used in some embodiments. In general, the number of levels of servers in the hierarchy of servers is based on the system load and specific capabilities of computers selected as servers, as understood by a person skilled in the art.

The computers employed as servers can range from personal computers to larger computers, e.g., workstations and multiprocessors, selected as understood by persons skilled

in the art. Illustrative such computers are Pentium™-based computers and computers manufactured by Sun Microsystems™. The computers employed by the users are referred to as user's workstations and can be personal computers or other devices (e.g., Internet appliances) with sufficient processing capabilities as understood by a person skilled in the art.

5 Illustrative such user workstations are personal computers using Pentium™ microprocessors and operating under a Windows 95™ or 'Windows 98™ operating system. One skilled in the art of computer systems will understand that the present invention is not limited to a particular class or model of computer employed for both servers and users' workstations and will be able to select an appropriate system based on the specific requirements.

10 It should be noted that a typical computer system that may be employed here as a server or a workstation includes a central processing unit, a primary memory, e.g., RAM, one or more secondary memory storage devices, e.g., floppy or hard disk drives, CD-ROMs, DVDs, or tapes, and communication interfaces, e.g., a modem, a network interface, or other connection to external electronic devices, such as a serial or parallel port. It also includes  
15 (primarily for the workstations) input devices, e.g., a keyboard, mouse, microphone, or other similar device and output devices, e.g., a computer monitor or any other known computer output device. A system bus provides communications between these elements.

Program execution of such a typical computer is usually controlled by an operating system, such as WINDOWS, DOS, or UNIX. Programs executed by the servers are resident  
20 at the server computers and run under the control of the server operating system. In the preferred embodiment, the user workstations execute application programs (applications), resident at the workstations, under the control of the operating systems of the workstations. In other embodiments and as understood by a person skilled in the art, the functions of the

workstation applications may be performed by the server and workstations may only include a browser, as known in the art, that enables a user to exchange information with the server.

The root server and master database **50** contains real-time security information, including order book information for each security that can be traded on the system, and a list  
5 of subscribers for each order book (see **FIG. 3**). In other words, it holds offers to buy and sell for each such security that are provided by the users of the user-to-user trading system (or by the national exchanges, if they provide access to their order books). As noted, the "book" refers to such user-to-user trading orders entered for each security. To support day-time trading, the master database includes real-time securities quote data supplied from  
10 conventional sources of such data. Advantageously, at least the stocks that are traded on the national exchanges can be traded on the system of the preferred embodiment.

Intermediate servers and databases **40** and replica servers and databases **30** include copies of the master database. Updates to the master database **50** are sent on a real-time basis to the databases **30**, **40** via communications networks **34**, **36**, **46**. In the preferred  
15 embodiment, servers and databases **30**, **40** and **50** are all located at the same site and the networks **34**, **36**, **46** are the same network, which is a local area network (LAN); but in alternative embodiments the servers and databases **30**, **40** and **50** may be dispersed and the networks could also be the Internet, public or private telephone networks, or other methods of linking computers as known in the art. Network **15** preferably is the Internet, but may be  
20 public or private telephone networks or other communication networks known in the art.

In the preferred embodiment, when a replica server **30** receives updated information from a user workstation **10**, the replica server **30** does not update its database, but transmits the updated information to the root server **50**, which then updates the master database.

Thereafter, the updated information is transmitted to the intermediate and replica servers **40**, **30** which then update their databases. In an alternative embodiment, the replica and intermediate servers **30**, **40** update their databases as they are transmitting the information up to the root server **50**. In another preferred embodiment, the intermediate servers **40** do not include databases which replicate the master database, and essentially transmit information between the replica servers **30** and the root server **50**. This system enables real-time responses on Internet architecture.

As indicated, each workstation **10** is also connected to a broker/dealer server and database **42** via a network **12**. The broker/dealer server and database **42** contains a workstation user's account information (e.g., number of shares of each stock held by the user, amount of money in user's account, and other data relating to user's securities' holdings). In the preferred embodiment, the network **12** likewise is preferably the Internet. Alternative embodiments of network **12** include LANs, telephone networks, and other known methods of linking computers. Each broker/dealer server **42** is also connected via a network **41**, **44** to the master server **50**. In the preferred embodiment, this network connection is a secure point-to-point communication link. In an alternative embodiment, the network can be the Internet, telephone network, or another method of linking computers.

**FIG. 2** illustrates an alternative embodiment. In such an alternative embodiment, all of the user's account information is stored in the master database **50**. Thus, there is no need for a user to access a separate broker/dealer server and database to obtain approval for transactions conducted on the system. This embodiment can be supported by the computer architecture discussed in connection with **FIG. 1** except that the broker/dealer computer is not used. That is, as illustrated in **FIG. 2**, the root server **50** communicates with optional

intermediate servers **40** which in turn communicate with replica servers **30**. The replica servers interact with users' workstations **10**. In this embodiment the servers store information relating to users' accounts and portfolios as well as to the data discussed above. This information is dynamically updated as a result of user transactions.

5           **FIG. 3** is a flow diagram illustrating the operation of the preferred system for the user-to-user trades. This flow diagram provides an example of the steps by which a user connects to the system of the preferred embodiment, requests and receives a displayed order book for a selected stock, and purchases shares of that stock. Based on these examples, a person skilled in the art will understand how other sequences of operations for user-to-user trading can be  
10 performed. Also, based on this example, a person skilled in the art will understand how traditional trading during the day on national exchanges is performed in the preferred system. Preferably, traditional trading is accomplished on the broker/dealer system, except that real-time quotes for selected securities are continuously provided by the system.

To connect to the trading system of the preferred embodiment, a user at step **310** first  
15 activates the application which generates on the display screen of the user's workstation a connection status display (see **FIG. 53**) that establishes a connection to the server/database of the user's broker/dealer. As noted, in the preferred embodiment, the application is a computer program resident and executable at a user's workstation. When the user's ID and password are verified by the broker/dealer's server, the application establishes at step **314** a second,  
20 contemporaneous connection to the load balancer **20** for the replica servers **30**. At any one time it is expected that a large number of individuals will be connected to the hierarchical server and database structure **55** as well as to a selected broker/dealer server and database **42** of their choice. The load balancer determines to which replica server **30** each user should be connected to so as to substantially evenly distribute the load among the replica servers. This

determination may be based on criteria such as which replica server has the least number of users connected, which replica server is next in order, or on other considerations known in the art. The load balancer then transfers, at step **318**, the user's connection to the selected replica server **30**. The selected replica server and the broker/dealer server then provide to the user's workstation the information needed by the application to generate various displays. To avoid undue repetition, the subsequent description often describes a user's application as connecting to a replica server, instead of describing the application as first connecting to a load balancer and then to a replica server. It will be readily apparent to those skilled in the art that in such cases a load balancer, although not mentioned, is understood to be the initial connection point.

At step **322** the user selects a stock of interest by typing the stock symbol into an appropriate display (see **FIG. 6**, slot **642**); and at step **326** the application at the user's workstation sends the identity of the selected stock to the replica server **30**. The replica server and database then adds this user to the subscriber list for the order book of the selected stock. See step **330**. That is, the user is listed as a user who is to receive order book information for the selected stock. Thereafter, at step **334**, the replica server sends order book information to the user's application and continues to send updated information to the user's application in real-time. As indicated at step **338**, the application uses the order book information to fill in the order book display (see **FIG. 6**) and related displays. The user then views the order book display and related displays. Assuming that the user decides to sell some of his/her holdings in the displayed securities, at step **342** he/she fills in a trade ticket (see **FIG. 11**) for a sell order and selects the "Verification" button on the trade ticket display. (Alternatively, at this point, the user may choose to purchase securities. The purchase transaction is discussed below in connection with steps **374-398**). As indicated, at step **346**, the user then views the final

verification screen (see **FIG. 56**) provided by the application and selects the "Send" button. In response, the order is transmitted to the server and database of the user's broker/dealer, which checks, at step **350**, whether the user has sufficient shares in his account for the requested transaction. The preferred embodiment does not provide for a short-sell option in the user-to-  
5 user trading, although this capability may be provided in the alternative embodiment, as understood by a person skilled in the art. Short-selling is customarily provided for trading during the day on a broker/dealer system.

If the transaction is approved, at step **354**, the server of the broker/dealer sends the user's approved sell order to the root server **50**, which attaches a system ID to the order,  
10 identifying the user's account, his order (stock symbol, size, price, and whether buy or sell), and his broker/dealer. At step **358** the root server **50** updates the master database with user's order, and revises the order book for the selected stock. The new sell order information is transmitted, at step **362**, to the replica servers **30** which update their respective replica  
15 databases to reflect this sell order. Each replica server, which is connected to users that are listed as subscribers to the order book of the selected stock, sends at step **366**, the updated order book information to the subscribers' applications, including the user's offer. The applications receive this sell offer and, at step **370**, display the offer in the order book displays of the subscribed users. Although the order book information is provided from the  
20 appropriate replica server, the account information is preferably provided from the broker/server system.

Subsequently, another user who is likewise connected to the hierarchical server and database structure **55** as well as to a broker/dealer server **42** of his choice sees the first user's sell offer and, at step **374**, accepts the offer (executing a buy order). The buy order, along with an ID assigned to the corresponding offer to sell, is transmitted at step **378**, to the server

and database of the buyer's broker/dealer using another, preferably Internet, connection that the buyer has to his broker/dealer system. The buyer's server checks, at step 382, whether the buyer has sufficient funds or credit in his account to purchase the stock offered by the seller.

The buyer may purchase stock on margin if he has a margin account and sufficient credit with the broker/dealer. Also, a broker/dealer may not authorize a transaction if buyer's profile and preference do not correspond to the characteristics of the security that he wants to purchase.

If the transaction is approved, at step 386, the buyer's broker/dealer sends the approval of the order along with sufficient information to identify the buyer and the order to the root server 50. At step 390 the root server 50 notifies the broker/dealer systems of both parties of the details of the transaction so as to identify which funds and shares must be transferred to which accounts, updates the master database to reflect the completed transaction, and transmits the updated order book information to the replica servers. The replica servers then update their respective databases and, at step 394, transmit the updated order book information to the subscribing users. In the updated order book, the accepted offer to sell has been removed. The broker/dealer servers of both parties to the transaction notify the applications of the parties that the transaction is confirmed (by updating the open positions and related displays, and preferably also by email), and at step 398, the applications update the current positions and related displays of the parties to the completed transaction. The exchange of securities and money takes place subsequently in a conventional way between the broker/dealers of the buyer and the seller.

FIG. 4 illustrates how the alternative embodiment illustrated in FIG. 2 enables the real-time updating and transmission of information. In general, when a user provides new data to the replica server that his work station is connected to, this data propagates to the root server 50. From the root server 50 it then propagates to all the other replica servers. For



example, user (A) enters at **470** an order to buy or sell a security at a certain price level (e.g., buy 100 shares of IBM at \$180.00). The system then passes the user's order via step **485** to the root server **50** through an intermediate server **40**. The root server **50** then records the order and re-transmits the information through all the intermediate servers **40** and to all of the  
5 replica servers **30**, so that all databases remain synchronized. The front-line replica servers then transmit the user's order to the other users **455**, **460**, **465**, **475**, and **480** who are on the subscriber-list for the security on order. If any of those users accepts the order of user **470**, this information goes up and down the chain the same as the order from user **470**.

**FIG. 5** illustrates a graphical user interface (GUI) of the preferred embodiment. The  
10 depicted screen, known as the master trade screen, comprises several parts. The upper left part is a visual quote and order book display **500** (see detailed view in **FIG. 6**). Below that is a trade ticket **510** (detailed view in **FIG. 11**). The upper-right part is a news and information display **540** (detailed view in **FIG. 10**). Just below that is an open orders display **545** (detailed view in **FIG. 7**). Immediately below that is a current positions display **550** (detailed view in  
15 **FIG. 8**). Just below that is a financial summary display **560** (detailed view in **FIG. 9**). Below that is a stock summary display **520** (detailed view in **FIG. 12**). At the bottom of the master trade screen are function buttons **530** (detailed view in **FIG. 15**).

The function buttons **530** are of sufficient size to allow for the display of full-length labels sufficient to ensure maximum comprehension by the user. They are also of sufficient  
20 size and height to allow for the insertion of descriptive labels in languages requiring long character strings (German, e.g.). This feature enables the easy customization of the GUI for global markets.

The order in which the screen components **540**, **545**, **550**, and **560** are displayed in the right-hand display area can be altered based on user selections provided by permutation of the order in which the function buttons in bar **530** are selected. The buttons **530** are also used to remove the screen components **540**, **545**, **550**, and **560** by a single click selection of the

5 corresponding button on the function button bar **530**. When screen components **540**, **545**, **550**, or **560** are shown in the master trade screen, the corresponding function buttons are highlighted in reverse video.

A user can alter the vertical size of screen components **540**, **545**, **550**, and **560** by selecting and dragging the borders of the components. This feature allows a user to determine

10 the amount of information displayed in each of the screen components **540**, **545**, **550**, and **560**. The user can also change the size of the entire master trade screen by dragging the screen borders.

The combination of elements of the master trade screen display enables a user to view critical information necessary to make an effective decision concerning the status of the market

15 in a stock or stocks of interest: current account balances, open orders, positions, news and research, e-mail communication, overall portfolio status, and the condition of all major markets. This information is displayed without the user having to switch to alternate screen views and without using overlapping windows. The order book display **500** (and the related displays – most viewed stocks display, chart display, and most active stocks display – see **FIG.**

20 **57B**) and the stock summary display **520** are provided by the application software based on data received from the replica server **30**. The open order display **545**, current positions display **550**, and the financial summary display **560** are provided by the application software based on data received from the server of the user's broker/dealer. Each of the displays **500**,

510, 520, 540, 545, 550, and 560 has a "Help" button in the upper right hand corner that provides a multi-level help system as set forth in greater detail in conjunction with FIG. 26.

FIG. 6 depicts a visual quote and order book display 510 for use in user-to-user after hours trading, and to display national market information. The status of the market (open or closed) is shown at 610. The three columns 614 at the right comprise a compressed view pricing map, which shows a simplified view of the bid, ask, and spread for the stock in active trading and also shows the last trade of the day on the national exchange. The user's position is also displayed and is based on the average price of the shares held in the user's account. It is shown by the graphic indication 640 on the vertical price scale section. This graphic indication is an analog representation of the user's average price for the shares held in the stock shown in the price map display 614. If the user's position is off the scale, an indicator is used to show the direction of the user's position. For illustration, such an indicator is shown in FIG. 6 at the bottom of the column containing the user's position indicator 640. The information displayed at 648 immediately below the price map display 614 is an alphanumeric summary of the user's average price of the stock, current profit or loss based on the current price of the stock, and the user's overall P&L percent gain or loss. This display is designed to provide a high-level view of the stock and its relative movement compared to the previous market and the user's position. If the user clicks on "More info" 616, he is linked to an after-hours information site. The column 620 under "Day" is the national market indications column. The column 624 under "Nite" is the after-hours market indications column. The horizontal stripe 628 displays the amount of the last trade/ask, and is green. The horizontal stripe 632 immediately below that is a "zoom" view of the detailed spread, and is black. The horizontal stripe 636 just below that is the bid. The horizontal stripe 644 is the last sale price

in the national market, for the stock shown. The three displays **648** ("Your pos.," "P&L," and "Overall P&L") display the user's position data on the selected stock, calculated in real-time based on the real-time quote.

The seven columns to the left of the pricing map are the order book display. The order book display enables the user to see at a glance how a particular stock is trading on the user-to-user system. The order book is designed to give a lay user the same type of information that is available to brokers at the national exchanges.

The center column under "Decimals" is the price column, and lists stock prices in 1/16 increments. The three columns to the left of the price column set forth buy side orders and the three columns to the right set forth sell side orders. The "Limit Qty." and "AON Qty." columns list the size of orders at each price level posted into the system by other users. The Your orders show columns the user's order in the stock. The area **668** (in this example, containing the number 6000) contains the amount of the current ask size. The area **672** (in this example, containing the number 52.1875) contains the amount of the current ask price, and is highlighted in yellow.

The area **676** contains the price spread, and has a black background. The area **680** contains the current bid size (here, 200), and the current bid price (here, 52). It is highlighted in yellow. The "Order Bk." button **681** is selected to call into view the order book display as shown. The button **656**, "Compress spread," compresses the spread and orders included in the spread down to one line. The compressed view shows the last bid, best offer, and a single line spread shown on a red background with white characters (see **FIG. 54**). The quantity shown in the red bar is the total price of the spread in one line. If there are "all or none" (AON) orders contained within the spread they are shown as total amounts. When the display shows the compressed spread, the button **656** shows the label "Expand spread." Clicking the button

656 then returns the display showing the full, evenly incremented spread. The button 664 ("Symbol") is selected when the user wants to display a different stock. When the button 664 is clicked, a data field is displayed wherein the user may enter the symbol of the new stock to be displayed.

5           When the "Chart" button 682 is selected, the order book display is replaced with the chart of stock activity displayed as in FIG. 14. When the "Most active" button 683 is selected, the stock summary display shown in FIG. 57A is displayed, with the most active stocks shown in real-time and updated in real-time. The "News out" button 660 flashes or is highlighted when news is out on the stock in view. The "Show news" button 688 causes  
10 screen component 540 to show the current news summary and details for the selected stock. An alternative means of displaying the stock order book, chart, and news is by double-clicking the desired stock shown in the stock summary display. The "Vol." number 677 indicates the volume of shares traded in the currently active market (national market or after-hours market). The "Hi" price 678 is the high sale price for the selected stock during the current trading  
15 session. The "Low" price 679 is the low sale price for the selected stock during the current trading session. The "Last Nite" number 689 shows the last sale price in the after-hours market. The "Chng. Nite" number 690 shows the percent change in the after-hours market. The "Last Day" number 691 shows the last call in the national market. The "Chng. Day" number 692 shows the percent change in the national market. The "Day Mkt" and "Nite Mkt"  
20 buttons 669 toggle the displayed "Vol.," "Hi," and "Low" numbers 677, 678, and 679 between the after-hours market and the national market.

FIG. 7 depicts an open orders display 545. This display shows the user's orders that have not yet been completed. A "Change" button 710 at the lower right is used to change an

order that is still open (see **FIG. 23** for a description of how an open order is changed). A "Cancel" button **730** at the lower left is used to cancel an order that is still open (see **FIG. 24** for a description of how an open order is canceled). A "Sort" button **720** is used to display the open orders according to different parameters.

**FIG. 8** depicts a current positions display **550**. For each security in the user's account as identified by a standard symbol, the display indicates the number of units held, the cost per unit, the current price, the change in value and the dollar amount of the profit or loss. The "Sell" button **810** is used to pre-populate a trade ticket with a selected stock's information as listed in the user's current positions display. A conventional Windows-type scroll bar and up and down keys on the right hand side of the display are used to move a selection bar through the display of stocks. The "Sort" button **820** is used to sort the displayed positions by different parameters (price, quantity, etc.). The "Reports" button **830** is used to request news on the selected stock.

**FIG. 9** depicts a financial summary display **560**. The balance for each category is shown in the "Balance" column **910**. The profit or loss for each account category is shown in the "Profit/loss" column **920**. The change in each account category for the day is shown in the "Change/Day" column **930**. The change in each account category for the year-to-date is shown in the "Change/YTD" column **940**. The "Equities" row **945** lists the user's equities account information. The "Mutual Funds" row **950** lists the user's mutual funds account information. The "Grand sum" row **955** lists the user's summarized account information. The "Cash acct." row **960** shows the funds in the user's cash account. The "Margin" row **965** shows the funds in the user's margin account. The "Open orders" row **970** shows the value of

the user's open orders. The "Negotiations" row **975** shows the value of the stocks the user has in negotiations. The "Buying Power" row **980** shows the user's buying power.

**FIG. 10** is a news and information display. The news and information display is actually a customized Internet web browser, and its functionality is derived from that fact. For example, when the "Show Email" button **1010** is selected, a standard email server interface is displayed (see **FIG. 55**). The "Search" slot **1030** is used in the same manner as the "Address" slot in Internet Explorer and the "Location" slot in Netscape Navigator. The "Back," "Forward," "Home," and "Bookmarks" buttons, e.g., function the same way as their counterparts in other browsers. If the email display is being shown, the user clicks the "Show news" button **1020** to return to the news display.

**FIG. 11** depicts a trade ticket display **510**. The "Action" slot **1125** is used to indicate whether the order is a buy order or a sell order. The "Quantity" slot **1130** is filled in with the number of shares in the user's order. The "Symbol" slot **1135** is filled in with the symbol of the stock the order is for. The "Limit" slot **1160** is used to indicate the nature (e.g., limit, stop) of the order. The "Limit Price" slot **1140** is filled in if the order is a limit order. The "Stop Price" slot **1145** is filled in if the order is a stop order. The "Duration" slot **1150** is used to indicate the duration of the order (e.g., day, good till canceled). The "Condition" slot **1155** is used to indicate whether there is a condition on the order (e.g., all or none). The "Account" slot **1165** is used to indicate the type of account used. The "Route to" slot **1170** is used to indicate special routing instructions (route order to a specific market). The user's buying power is displayed in the line **1112**. The user's balance if the proposed trade is executed is displayed in line **1114**. The total cost of the proposed trade is displayed in line **1116**. The "Clear" button **1115** clears the trade ticket entries. The "Negotiations allowed" box **1175** is

checked if the user is willing to negotiate on the order, and the "Anonymous" box **1180** is checked if the user wishes to remain anonymous. The "Verification" button **1110** is clicked to display the "Final Verification" screen.

**FIG. 12** depicts a stock summary display. The button "WIT" **1210** at the left of the summary screen display is clicked to display the most active stocks in the trading system.

When the button **1210** is clicked by the user, the application notifies the replica server, which then sends the required information back to the user's computer, where the application displays the most active stocks on the system. The button "Watch stks." **1220** is clicked to display stocks the user has added to his "watch list" (same as "wish list"; see **FIG. 51**). The

button **1230** is used to display stocks the user holds in the system.

**FIG. 13** depicts a multiple pricing maps display. Illustratively, **FIG. 13** shows pricing maps for six different stocks in the after-hours market. Each pricing map provides the same information in the same format as that in the pricing map depicted in columns **614** of **FIG. 6**.

The identity of each stock is shown at the top of the pricing map **1335**. If the user double-

clicks on the closing price of the stock **1310** in the national market (NM), a chart view of the stock is displayed (see **FIG. 14**). If the user double-clicks on the spread **1330**, an order book

display (see **FIGS. 5 & 6**) for the selected stock is provided. The "News out" status indicator **1420** flashes when news is out on the stock that may have an effect on the stock's movement.

To pull up news in a display on the right hand panel of the interface, the user double-clicks on

the "News out" indicator. If the user double-clicks on a Buy button **1325** (or a Sell button),

the application automatically pulls up a trade ticket (see **FIGS. 5 & 11**) that is filled with data from the user's positions file. The selection of "Sell" populates the trade ticket with the user's entire position in the selected stock. The selection of "Buy" populates the trade ticket with



information including a default quantity value set in the preferences menu by the user. The user can double-click on the best bid or offer and hit or take the quantity at that price level. This action automatically populates the trade ticket with the selected price. The user can adjust any values in any pre-filled fields. The red box **1315** in the center section of each

5 pricing map shows the average price of the user's shares in the stock. This is a graphic analogue of the user's average price in the selected stock as shown in the user's positions file. A double-click of the red box **1315** brings the selected stock to the top of the user's positions file. If the user has multiple purchases in his file, the largest quantity is shown first. The values **1340** are updated in real-time as the market moves.

10 **FIG. 14** depicts a real-time chart of stock activity. The thick black vertical line **1410** shows the close of the national market and the opening of the after-hours market. Line **1410** is blue. A similar line, not shown in **FIG. 14**, shows the closing of the after-hours market and the opening of the national market. The vertical lines **1430** show hour-long increments. A pricing map is shown on the right hand side of **FIG. 14** and displays essentially the same

15 information in the same format as that depicted in columns **614** of **FIG. 6**. The horizontal bar **1415** shows the last trade/ask price in the after-hours market (in **FIG. 14**, the after-hours market is the market that is open). The bar **1415** is green. The horizontal bar **1425** is yellow, and shows the current bid price. The area **1420** between the bid and ask is the spread, and is in black. Since the national market is closed, the last price on the national market is indicated

20 by the horizontal bar **1435**, and that bar is green. The vertical bar **1434** has an indicator **1432** (preferably red) showing the user's average share price in the stock shown. If a user's position in the stock shown is not viewable within the scale of the price chart a visual indication is shown at the top or bottom of the user's position column **1434** indicating the

direction in which the user's position sits with respect to the current market. The horizontal bar 1450 optionally contains a scroll bar (not shown) which permits the user to scroll horizontally over the past 24-hour period. The horizontal lines 1455 are price level lines which permit the user to quickly visualize pricing trends; the dollar values are provided in column 1470. The price increments can be changed by clicking on the "Price map scale" button 1422, and then choosing \$1, \$5, or \$10 from the pop-up menu (not shown here, but see, e.g., FIG. 60, which has the same menu displayed under the "Price map scale" button). There are stocks whose daily fluctuations vary widely. The price map scale permits the user to visualize wider price ranges by selecting price scale increments of \$1, \$5, and \$10. Such a selection re-scales the vertical axis of the price map to allow visualization of the entire day's trade range. As the price map's vertical scale changes, the dollar increments change but the vertical scale divisions do not change. The chart view of the stock will either expand or contract based on the scale values selected. The short vertical bars 1460 show the market spread at the time indicated. In the national market, these bars are black; in the after-hours market, they are blue. The short marks 1465 on the bars 1460 indicate the last trade price for the stock. In both the national market and the after-hours market, the marks 1465 are green. The "Order Bk." button 1412 allows the user to change the display from the chart display to the order book display (see FIG. 6). The "Most active" button 1416 allows the user to change the display from the chart display to the most active display (see FIG. 57A).

FIG. 15 depicts a function button display 530. The Shrink button 1520 is used to shrink the display.

FIG. 16 illustrates four different views available through expanding and shrinking the master trade screen. If the initial view is the full master trade screen 1610, the user clicks the

"Shrink" button 1520 to change the view to just the summary stock display and the function buttons shown in 1620. If the "Shrink" button 1520 is clicked again, the view shrinks to just the function buttons 1630. If "Shrink" is clicked again, the view is changed to the fully compressed view 1640. Finally, if "Shrink" is clicked one last time, the application displays the message box: "Do you want to close your connection to [the system of the preferred embodiment]?" If the user selects "Yes," the application closes the display and only the icon of the subject system is displayed. FIG. 28 provides a flow diagram depicting the operation of the Shrink button 1520.

Returning to FIG. 15, the "Expand" button 1510 is used to expand the display. See FIG. 29 for a detailed description of how the expand button operates. The "Peel off display" function button 1515 is used for displaying several order books at once (see FIG. 27). The "Alerts" function button 1525 is used to set alerts on stocks of interest (see FIGS. 30 & 52). The "Open orders" function button 1535 is used to display the user's list of open orders (see FIG. 34). The Positions and P&L ("Pos./P&L") function button 1540 is used to display the user's positions and profit and loss information (see FIG. 35). The "Account history" function button 1545 is used to call up a display of the user's account history (see FIG. 36).

The application software used in the practice of the invention is described in greater detail in conjunction with FIGS. 17-40 below.

FIG. 17 is a flow diagram illustrating software which enables a user to obtain and install the graphical user interface (GUI) component of the preferred embodiment and open a new account. Initially, at step 1710, a user desiring to use the system of the preferred embodiment accesses the Internet website of the system administrator. The user views and/or downloads, at step 1715, the software and hardware requirement list from the administrator's

website. At step **1720** the user determines if he has the proper software and hardware are present on his computer. If not, at step **1725**, the user obtains upgrade information and URLs (Internet addresses) where the proper software can be obtained. Alternatively, the user is provided with the necessary software by the system administrator, such software being

5 obtained from an application server database maintained by the system administrator.

Once the proper software and hardware are present, at step **1730**, the user downloads the full application software from the application server. The user then opens the application on his personal computer. See step **1735**. Once the application is opened, the application establishes a connection over the Internet, and at step **1740**, the user attempts to open an

10 account. At step **1750** the user receives data from an account opening database and help database of the system, and enters the sequence required for opening an account on the system. If the account is successfully opened, the full application is active for trading based on the balances in the account and other limitations to be determined by the system administrator. See step **1755**. If the account is not successfully opened, the user is connected to the system's

15 account opening database and help database for assistance.

**FIG. 18** is a flow diagram illustrating software for logging on to the system and visualizing the stock market in the alternate embodiment described in connection **FIG. 3**. Initially, at step **1805**, the user opens the application (Java application, in the preferred embodiment). The Java application then, at step **1810**, attempts to initiate a connection to a

20 replica server. At step **1815**, if the connection to the replica server is confirmed , the user inputs, at step **1820**, the user's name and password at the log-on screen (see **FIG. 53**) of the application. If the connection to the replica server is not confirmed, at step **1825**, a dialog box

is displayed by the application to the user describing a possible cause of the problem and a possible way to resolve it.

At step **1820** after the connection has been successfully established and the user's name and password have been entered, the application transmits, at step **1830**, the user's name and password to the replica database. The database on the replica server then checks, at step **1835**, the accuracy of the name and password. If there is no match, the user, at step **1850**, again receives a dialog box with an indication of the problem and a possible solution. If there is a match, the replica server notifies the root server that the user has successfully logged on. At step **1840** the changes to the replica database are provided to the master database.

Once the user's logon is complete, the application receives, at step **1860**, the user's filtered information based on user's preferences saved on the replica server. In an alternate embodiment, the application receives unfiltered or partially filtered information from the replica database, and the application does further filtering once the information has been received. The application then, at step **1865**, displays (depending on the user's display preferences) a master trade screen showing all critical trade data, based on the user's preferences. As the user's position in his stocks changes, the replica database and server, at step **1870**, automatically updates the user's display in real-time. Each time a change occurs in the information held on the replica server, the master database is updated accordingly at step **1840**.

**FIG. 19** is a flow diagram illustrating software of the preferred embodiment which enables a user to view critical trading and account information on one screen so as to facilitates fast and accurate trading of stocks. Initially, at step **1910**, the user opens a master trade screen. Preferably, the master trade screen is that shown in **FIG. 5**. The master trade screen, at step **1915**, displays all information necessary for the user to make a decision about

the status of his account, the status of the stocks of interest, and the status of the markets in general. Illustratively, data displayed on the master trade screen includes a trade ticket, real-time quotes, the user's positions, open orders, an order book display, financial summary, account balances, news and information related to stocks of interest, and other items

5 illustrated in connection with **FIG. 5** and discussed herein. After viewing the master trade screen, the user selects at step **1920** a trend chart view to review the trend of the stock of interest in either the national market or the after-hours market.

At step **1925**, the user may decide to look at another stock and, at step **1930**, he selects the stock of interest from the stock summary display. The application transmits the  
10 user's request to the replica server and database, which transmits information on the selected stock back to the application executing on the user's workstation. The application, at step **1935**, displays the new stock in the order book view and, at step **1940**, populates the trade ticket (see **FIGS. 5 & 11**) with information regarding the selected stock. At step **1945**, the application displays news for the selected stock in the news display (see **FIGS. 5 & 10**). In  
15 addition, the application highlights, at step **1950**, the user's position in the selected stock in the positions display. At step **1955**, the application indicates the alert status for the selected stock, and, at step **1960**, it shows selected help functions in the background. At step **1965**, the application shows profit or loss if the user sells his position in the selected stock at the current level shown in the order book display (see **FIGS. 5 & 6**).

20 **FIG. 20** is a flow diagram illustrating software of the preferred embodiment which enables a user to visualize the detailed market in stocks. For the purposes of illustration, we assume that, at step **2010**, the user desires to see the status of stock not shown in the current master default view. The user then, at step **2015**, views basic information on stocks by

selecting alternate summary screen views using the stock summary display of **FIG. 12**. The alternate views are (1) in the stocks the user holds in the system ("Your stks."); (2) stocks that are among the most active in the current market ("WIT"); and (3) stocks that the user wishes to monitor ("Watch stks."). The user switches from one view to another by clicking the appropriate button (**1210**, **1220**, or **1230**) at the left of the summary screen display (see **FIG. 12**). At step **2020**, if the stock in which the user is interested is displayed in the summary display, the user selects, at step **2030**, the stock from the summary display (by clicking on its symbol) to obtain more detailed information regarding the stock. If the stock is not shown in the summary display, the user selects, at step **2025**, the "Quick quote" function to select the stock of interest (see **FIG. 51**). The user can also enter stock into the stock summary display by typing into or over stock in the wish list. Once the stock has been selected, the application transmits to the replica server the fact that the user is requesting information on a different stock. In response, the replica server provides data on the new stock to the user's application and keeps this information updated in real-time. Next, at step **2035**, the application populates the master trade screen with detailed data on the selected stock. At step **2040**, the user reviews the status and price of the stock on the master trade screen and, at step **2045**, determines the best available price based on the data provided on the master trade screen.

**FIG. 21** is a flow diagram illustrating software of the preferred embodiment which enables a user to execute a buy order for a stock. We assume that the user makes a decision to purchase shares of stock, and at step **2115**, the application retrieves and displays summary information including (1) the stocks held by the user; (2) stocks that are among the most active in the current market; and (3) stocks that the user wishes to monitor. If the stock in which the user is interested is displayed as part of this summary (see **2120**), at step **2130**, the user indicates to the application that he/she desires to view further details regarding the stock

listed on the summary display. If the stock is not listed in the summary, at step **2125**, the user may select the "Quick quote" function to display data regarding the stock of interest, or by typing into or over stock in the wish list. The user can change the order in which stocks are listed in the stock summary display by using the preference screen to position the stocks by  
5 industry, position, size, or P&L.

After the user has selected the stock, the application transmits this data to the replica server. In response, the replica server sends data on the new stock back to the application running on the user's workstation and then updates this data in real-time. At step **2135**, the application populates the master trade screen with the relevant information on the selected  
10 stock. At step **2140**, the user inputs additional information into the trade ticket (see **FIGS. 5 & 11**). Then, if the user is still satisfied with the transaction, at step **2145**, he/she selects the "Order Verification" function, and in response, at step **2150**, the application checks for errors in the data entered into the trade ticket. If there are errors (step **2155**), then at step **2160**, the application retrieves and displays appropriate error messages and, in some instances,  
15 suggestions on how to correct the error. Once the application determines that the ticket is error-free, at step **2165**, the application displays the "Final Verification" screen (see **FIG. 56**). At this point, the display flashes, to emphasize the significance of this operation. Thereafter, the user makes the final decision whether to send the buy order, and at step **2170**, selects the "Send order" option to facilitate the purchase. The request is then transmitted to the  
20 broker/dealer system used by the user.

At step **2180**, the application displays the order transmission status in the message line display. The application, at step **2185**, illustrates the buy order highlighted in yellow in the open positions display on the master trade screen. If the order has been filled on a national market, the broker/dealer's computer communicates this to the user's workstation. If the



order is accepted in the user-to-user market, the buyer's acceptance is transmitted to the root server via replica servers. The root server updates the root database and transmits that information back to the replica servers and databases. Thus the order is always visible as it moves through the execution process; the status of the order is always known. The application moves, at step **2190**, the buy order into the user's "Positions and Balances" display. At step **2195**, the application displays the account information reflecting this transaction in the master trade screen.

**FIG. 22** is a flow diagram illustrating software which enables a user to execute a sell order of a stock using the preferred embodiment. We assume that, initially, the user makes the decision to sell shares of a stock that he owns (see **2210**). Next, at step **2215**, the user selects the stock from the positions display **550** and selects the "Sell" button **810**. Once the stock has been selected, the application transmits to the broker/dealer's computer the fact that the user is requesting information on that stock and, in response, receives data on the stock. The application then, at step **2220**, populates the master trade screen and the trade ticket (see **FIGS. 5 & 11**) with available information on the stock. At step **2225**, the user fills in additional information into the trade ticket and checks the final total cost of the trade.

At step **2230**, the user selects "Order Verification" function and in response, the application checks, at step **2235**, for errors in the data that have been entered into the trade ticket. If at step **2240**, an error has been found, the application displays at step **3250**, an error message along with possible ways for correcting an error. Once the ticket is error-free, the application displays at step **2255**, a flashing final verification screen. The user then makes the final decision whether to send the sell order, and at step **2260**, selects the Send order function. The application then transmits the user's order to the broker/dealer system used by the user.

At step **2265**, the application assigns a reference number to the order and displays the order transmission status in three steps in the message line display. Then, at step **2270**, the application shows the order highlighted in yellow in the Open orders display of the master trade screen. After the order has been filled and confirmed, the application moves, at step **3275**, the sell order into the user's Positions and Balances display and displays updates to the user's account files and new balances in the master trade screen (see step **2280**) .

**FIG. 23** is a flow diagram illustrating software which enables a user to execute a change order in a stock purchase order already entered into the system. We assume that, initially, at step **2310**, the user makes a decision to change one or more variables of an open stock order (list **545**). At step **2315**, the user selects the stocks from the open orders display (see **FIGS. 5 & 7**) and selects the Change button **710**. In response, the application, at step **2320**, populates the master trade screen and trade ticket (see **FIGS. 5 & 11**) with information from the "Open Order" screen selection. The user, at step **2325**, changes information in the trade ticket, checks the final total cost of the trade, and **2330** selects "Order Verification."

In response, at step **2335**, the application checks for errors in the data that has been entered into the trade ticket, and displays the effect the changed order will have on the user's account. If an error has been found, the application, at step **2340**, displays an error message, and possibly options for correcting the error. If the ticket is error-free, the application displays, at step **2345**, a flashing final Verification screen, and in response the user may make the change order, via the "Send order" command. The application then transmits the change order to the broker/dealer's computer.

If the original order has already been executed, the user is alerted to that fact by a message indicated that the change order has been rejected. At step **2350**, the application

displays the order transmission status in the message line display. At step **2355**, the application shows the changes in the open orders display (see **FIGS. 5 & 7**) of the master trade screen highlighted in yellow. When the changes are confirmed, at step **2360**, the application removes the yellow highlight in the open positions display. The system then, at  
5 step **2365**, updates the display of the account data and balances accordingly on the master trade screen.

**FIG. 24** is a flow diagram illustrating software which enables a user to execute a cancel order for a stock purchase that has already been entered. First, the user makes the decision, at step **2410**, to cancel an order in the open orders file. The user then, at step **2415**,  
10 selects the stock from the open orders display (see **FIGS. 5 & 7**) and selects the "Cancel" button **730**. The application, at step **2420**, populates the master trade screen and trade ticket (see **FIGS. 5 & 11**) with information from the open order screen. At step **2425**, the user changes information in the trade ticket, checks the final total cost of the trade, and, at step **2430**, selects "Order Verification."

15 After the "Order Verification" function has been selected by the user, the application checks, at step **2435**, for errors in the data that has been entered into the trade ticket. If an error has been found, the application displays an errors message, at step **2440**, and possibly a suggestion how to correct it. Once the ticket is error-free, the application displays, at step **2445**, a flashing final Verification screen. The user then makes the final decision to send the  
20 Cancel order, and selects the "Send order" function. The application transmits the user's cancel order information to the computer of the broker/dealer.

If the original order has already been executed, the user is alerted to the fact that the cancel order is rejected. At step **2450**, the application displays the order transmission status in

the message line display. At step **2455**, the application then shows Cancel, highlighted in yellow, in the open orders list (see **FIGS. 5 & 7**) of the master trade screen. When the cancellation is confirmed, at step **2460**, the application removes the yellow highlight in the open positions display. At step **2465**, the system displays updates to the user's account files

5 balances on the master trade screen.

**FIG. 25** is a flow diagram illustrating software which enables a user to negotiate for a better price in a stock during the user-to-user trading of the preferred embodiment. At step **2510**, the user makes the decision to negotiate for a better price than the best bid and offer shown in the order book (see **FIGS. 5 & 6**). At step **2515**, the user double clicks on the

10 quantity column in the order book at a price different from the best bid and offer. The application requests the appropriate information from the replica server, and, at step **2520**, displays in the negotiations screen (see **FIG. 42**) a list of traders who have orders in the market at the selected price. Then, at step **2525**, the user selects the name of a trader to negotiate with directly. The application, at step **2530**, shows the negotiation ticket populated

15 with the selected trader's data. At step **2535**, the user then inputs an offer to the selected trader and, at step **2540**, selects the "Order Verification" screen and related costs summary. The user then, at step **2545**, reviews the verification screen and selects Send Order. At step **2550**, the application displays the order transmission status in the message line display and, at step **2555**, shows "Negotiation", highlighted in yellow, in the open negotiations display on the

20 master trade screen.

At step **2560**, the user's offer to the selected trader is transmitted by the application to the replica server, which transmits the offer to the root server. The offer is then transmitted through the appropriate chain of replica servers until it is received by the other party's

workstation where it is displayed on the negotiation screen in highlight. The other party, at step 2565, reviews the offer. The other party is provided with an option to accept, reject, or make a counteroffer. At step 2570, the response of the other party is transmitted to the user who made the offer. This process repeats until negotiations are completed or canceled (see 5 step 2575). When the order execution is confirmed, the application, at step 2580, removes the yellow highlight in the open positions display and moves the order to the account history file. The application then, at step 2585, displays the update to the user's account and balances in the user's master trade screen.

FIG. 26 is a flow diagram illustrating software and the computer operation of the 10 context-sensitive "Help" function of the preferred embodiment. If, the user encounters a situation that requires additional information (see 2610), at step 2615, the user selects the "Help" button from the upper-right-hand corner of the display for which help is needed. The application, at step 2620, populates the "help" display with a three-level help for the area selected by the user. The user, at step 3625, views an index of headings relating to the 15 problem and selects the desired topic. If necessary, the application, at step 2630, shows the next level of detail in the "Help" display. The user then, at step 2635, views detailed problem resolution text and diagrams, and requests additional detail if necessary. If more details are needed, at step 2640, the application displays the third level of detail, along with an Internet link to a help system. The user, at step 2645, selects the link to the server help functions and 20 the system connects to the on-line help server and displays more data relating to the problem. Then, at step 2650, the user selects whether to use a link regarding the help topic or telephone support. If telephone support is selected, the system, at step 2655, connects the user to the help desk by Internet telephone or other voice connection and the user interacts with the help

desk to resolve the problem (step 2660). If necessary, the system help desk, at step 2665, fills out a job order and files it with the on-line help administrator for review. At step 2670, the on-line administrator determines the priority of the reported problem and then, at step 2675, generates an addendum to the on-line help function and posts it in the "Help" system files. If the problem is critical, at step 2680, the on-line help administrator posts an e-mail message to users on the system. In any case, the on-line help administrator posts, at step 2685, an e-mail message to the user group forum.

FIG. 27 is a flow diagram illustrating software which enables a user to view several instances of order books on one screen. Initially, at step 2710, the user decides to view several stock order books on the display at once. The user, at step 2715, views basic information on the stocks by selecting alternate summary screen views. The views include: (1) the stocks held by the user; (2) stocks that are among the most active in the current market; and (3) stocks that the user would like to monitor. If a security of interest is shown in the summary display (see step 2720), the user selects, at step 2740, the security from the stock summary display (see FIGS. 5 & 13) to view the stock information in detail. If the security is not shown in the summary display, the user selects, at step 2725, the "Quick quote" function and related options. The user's request is transmitted by the application to the replica server, which transmits the relevant stock information back to the user's application. This new information is kept updated in real-time by the replica server. The application then, at step 2730, shows the quote on the selected stock, and the user, at step 2735, selects desired display options. When the stock has been selected, the application populates 2745 the master trade screen with detailed data on the stock. If desired, the user, at step 2750, selects the stock

symbol in the stock summary display, and, at step 3755, selects the Peel off display function from the function button display (see FIG. 15).

At step 2760, the application generates a new order book view for the selected stock.

That view is shown outside the master trade screen. The user, at step 2765, repeats the

5 operations 2720 through 2760 for stocks the user wishes to see at one time. The user then, at step 2770, drags order book views into the desired organization on the screen (see FIG. 57C).

In response, the application, at step 2775, displays the status of stock in the order book configuration in real-time. To trade from any order book view, the user, at step 2780, selects the "trade" function. In response, the application, at step 2785, pulls up the master trade

10 screen and populates the trade ticket with selected stock data (see FIGS. 5 & 11).

FIG. 28 is a flow diagram illustrating software for compressing the view of the master trade screen of the GUI of the preferred embodiment. FIG. 15 illustrates the effect of these steps on the master trade screen. Initially, the application shows the master trade screen at full size, see 2810. At step 2815, the user selects the "Shrink" function from the master trade

15 screen and in response, at step 2820, the application shrinks the display to show only the stock summary display and function buttons. If the user selects the Shrink function again (step 2825), the application, at step 2830, shrinks the display to show only function buttons. If, at step 2835, the user selects the Shrink function again, the application, at step 2840, shrinks the display to show the fully compressed view. If the user selects Shrink from the most

20 compressed view (see 2845), the application, at step 3850, displays the message box: "Do you want to close your connection [to the system of the preferred embodiment]?" If the user, at step 2855, selects "Yes", the application closes the display and only the icon of the preferred system is displayed.

**FIG. 29** is a flow diagram illustrating software for expanding the display of the GUI of the preferred embodiment to obtain the full view of the master trade screen. Illustratively, the application initially shows the most compressed view of the GUI of the preferred embodiment (see **2910**). The user, at step **2915**, selects the "Expand" function **1650** and the application, at step **2920**, expands the display to show only the function buttons and then at step **2925**, the user selects the "Expand" function again and the application, at step **2930**, expands the display to show the stock summary display and function buttons **1620**. If the user, at step **2935**, selects the "Expand" function once again, the application, at step **2940**, expands the display to show the full master trade screen **1610**.

**FIG. 30** is a flow diagram illustrating software of the preferred embodiment for alerting a user to movements in stock price according to user-defined preferences. Initially, the user makes a decision, at step **3010**, to have the system monitor stock movements and alert him/her accordingly. At step **3015**, the user views basic information for different stocks by selecting alternate summary screen views, which include: (1) the stocks held in the system by the user; (2) the stocks that are among the most active in the current market; and (3) stocks that the user would like to monitor.

If the stock of interest is shown in the summary display (see **3020**), the user selects, at step **3030**, the stock from the stock summary display (see **FIGS. 5 & 12**). If the stock of interest is not shown in the summary display, the user selects, at step **3025**, the "Quick quote" function and related options. The user's request is transmitted by the application to the replica server and it is kept updated in real-time by the replica server. Once data about the stock has been displayed, the user selects, at step **3035**, the "Alerts function," and the application, at step **3040**, displays the "Alerts set-up function" (see **FIG. 52**).



At step **3045**, the user chooses the criteria for the alert function and display options, and the application transmits **3050** the user's alert preferences to the replica server, which updates the user's profile on the replica database. The replica server then **3055** checks for movement in stock price, based on the user's selected criteria, in the stock of interest. The  
5 replica server automatically monitors price data and if an alert condition occurs, sends an alert (along with relevant stock information) to the user's application when appropriate (see **3060**). In response, the application, at step **3065**, displays the alerts in the stock summary display and may provide an audible alert. At step **3070**, the user receives the alert(s) and selects the stock from the stock summary display for detailed view in the order book. The user may cancel the  
10 alerts or revise the alert criteria (see **3075**) and the system continues to monitor the selected stocks based on the user's criteria (see **3080**).

**FIG. 31** is a flow diagram illustrating software of the preferred embodiment that enables a user to visualize the general status of stocks and related positions via an analog graphic display. Initially, the user desires a quick overview of the status of several stocks (see  
15 step **3110**) and, at step **3115**, selects the Summary view function. In response, the application, at step **3120**, populates the master trade screen with a summary view of the selected stocks. The user adds stocks to the view (step **3125**) by clicking on the appropriate symbol in the stock summary display (see **FIGS. 5 & 12**) and the application (at step **3130**) adds summary views to the master trade screen based on the user's selections.

20 If the user wants to trade one of these stocks, at step **3135**, the user makes a selection from the summary display that directs the application to enter active trade mode. As a result, the application, at step **3140**, automatically populates the trade ticket (see **FIGS. 5 & 11**) and prepares the master trade screen with data on the selected stock.

**FIG. 32** is a flow diagram illustrating software of the preferred embodiment that enables a user to visualize the best price in a security from an analog graphic display. The user seeks (step **3210**) the best price for the same security that is selling on different markets (see **FIG. 39**) and, at step **3215**, selects the symbol for this security from the stock summary display (see **FIGS. 5 & 12**) and the Show price options function. The application transmits the user's request to the replica server which, in response, transmits information to the application concerning the price of the stock in different markets. The replica server continues to transmit that information in real-time until it receives notice from the application to terminate the transmission.

The application, at step **3220**, populates the master trade screen with a summary view showing the price in all available markets for the security. At step **3225**, the user views the display showing the prices for the security in the available markets, and selects the preferred market and, at step **3230**, the application displays details of the selected market and automatically populates the master trade screen with relevant data (after requesting and receiving that data from the replica server). If a trade is desired, the user, at step **3235**, makes a selection from the summary display that directs the application to enter the active trade mode and, at step **3240**, it automatically populates the trade ticket (see **FIGS. 5 & 11**) and prepares the master trade screen with data on the selected stock.

**FIG. 33** is a flow diagram illustrating the operation of the news gathering and distribution system of the preferred embodiment. Initially, at step **3310**, the user defines his interest based on watch list stocks and portfolio holdings active in his account. The user then, at step **3315**, sets "News alerts" preferences for the watch list and active account stocks. At step **3325**, the system stores the user's preferences on the replica server database for the

watch list and the user's active positions. At step 3320, that stored information is also transmitted to the user account preferences database on the replica server. The same information is transmitted to the news server, at step 3375, which monitors stocks based on user preferences from the watch list and active account information. Alerts are sent from the news server, at step 3375, back to the replica database and server for distribution to the end user display at step 3320. The news server, at step 3375, also passes news and alerts, at step 3390 to outside services. Data out may include: news of the system's most active stocks; news of other stocks; news forecasts; real-time quotes; an order book applet; a chart applet; a most active applet; a news applet; or other specific news on the overall market on the system.

At step 3395, the news desk of the subject system performs three general functions. First, at step 3370, it receives highlighted news alerts based on filters from the news server and the system's most active updates, received from the trade match system via step 3385. These filters are applied to news feeds received via step 3380, from outside vendors. Second, the news desk prepares alerts messages, at step 3365, for posting in the "News out" button on the order book of the end user display. This information is transmitted, at step 3375, to the user via the news server and the replica database and server, at step 3320. Third, the news desk, at step 3360, prepares stories and highlights based on the sort functions in the news display. Again, this information is transmitted to the end user at step 3375 via the news server and the replica database and server at step 3320. The system then tracks, at step 3330, the user-defined list of stocks for news. The application displays, at step 3335, news alerts to the user according to a user-defined display configuration. The "News out" function is shown in the stock summary display (see FIGS. 5 & 12) or in the order book. At step 3340, the user then views a "News alert" and calls the stock to the order book display (see FIGS. 5 & 6). At step

3345, the application populates the "News" display (see FIGS. 5 & 10) with relevant news on the selected stock. At step 3350, the user chooses to see more detail or sorts the news by category. At step 3355, the application then populates the "News" display with additional relevant data.

5        **FIG. 34** is a flow diagram illustrating software which enables a user to view the status of his open orders in a stock. Initially, at step 3410, the user seeks to review his open orders in all stocks active in his account. At step 3415, the user selects the open orders function from the function buttons display (see FIGS. 5 & 15). At step 3420, the application displays the entire list of open orders in the open orders (see display in FIGS. 5 & 7) display of the master

10 trade screen. At step 3425, the user views the display showing the open orders. The user selects a stock, at step 3430, from the stock summary display (see FIGS. 5 & 12) and selects the "Open orders" function. The application then, at step 3435, displays only open orders for the selected stock in the open orders display. The user selects, at step 3440, the desired open order from the list. The application highlights the order for actions by the user, such actions

15 including cancel, change, or replace. At step 3445, the user selects an operation (e.g., cancel, change, or delete) from the open orders display. The application automatically populates the trade ticket, at step 3450 (see FIGS. 5 & 11), with information from the open orders display on the selected stock. At step 3455, the user executes the desired function as requested in the trade ticket. To hide open orders, the user selects, at step 3460, the Open orders function

20 from the function button display (function bar). The application then removes the open orders display and removes the indication from the open orders function, at step 3465.

**FIG. 35** is a flow diagram illustrating software which enables a user to view the status of positions and profit and loss information (P&L). Initially, at step 3510, to review his

positions and P&L in the stocks held in his account, the user selects the "Positions and P&L" button 1540 from the function bar, at step 3515. The application displays, at step 3520, the user's entire list of positions and P&L and related details in positions and P&L displays, 550, in the master trade screen. At step 3525, the user views the display showing the user's

5 positions and P&L in the display, organized by the sort function. At step 3530, the user selects a stock from the stock summary display (see FIGS. 5 & 12) and selects the "Positions and P&L" function. The application then requests updated information from the broker/dealer server on the user's positions and P&L in the selected stock. In an alternate embodiment, the application calculates the user's P&L based on the updated stock price and user account

10 information stored on the user's computer. The stock price information is kept updated in real-time by the replica server. At step 3535, the application displays only positions and P&L for the selected stock in the positions and P&L display. At step 3540, the user selects the desired stock position directly from the "Positions and P&L" display. The application highlights the stock for actions (e.g., buy, or sell) by the user. The user selects, at step 3545,

15 an operation from the positions and P&L display (e.g., buy, or sell). The application automatically populates the trade ticket, at step 3550 (see FIGS. 5 & 11), with information from the positions and P&L display. The user executes the desired function, at step 3555, according to the trade ticket functions. To hide the positions and P&L display, the user selects, at step 3560, the "Positions and P&L" function from the function bar. At step 3565,

20 the application removes the positions and P&L display and removes the indication from the positions and P&L button.

**FIG. 36** is a flow diagram illustrating software which enables a user to view account history. Assuming that, initially, at step 3610, the user seeks to review his account history, at

step **3615**, the user then selects the "Account History" function **1545** from the function bar.

The application displays, at step **3620**, the entire list of the user's account history and related details in a display in the master trade screen. The user views the display showing his account history at step **3625**, organized by the sort function. At step **3630**, the user selects a stock

5 from the stock summary display (see **FIGS. 5 & 12**) and selects the "Account History" function. At step **3635**, the application displays only account history for the selected stock in the Account History display. The user selects the desired account activity item, at step **3640**, directly from the Account History display. The application highlights the item for actions (e.g., more details, print) by the user. To hide the account history display, the user selects the  
10 "Account History" button from the function bar. The application then, at step **3650**, removes the "Account History" display and removes the indication from the "Account History" button.

**FIG. 37** is a flow diagram illustrating software which enables a user to view the status of his account balances. Initially, at step **3710**, the user seeks to review his account balances.

The user then, at step **3715**, selects the "Accounts" account balances function **1550** from the  
15 function bar. The application displays, at step **3720**, the entire list of account balances and related details in the "Accounts" display of the master trade screen. The user views, at step **3725**, the display showing his account balances in the display, organized by the sort function. The user, at step **3730**, selects a stock from the stock summary display (see **FIGS. 5 & 12**) and selects the "Accounts" function **1550**. The application, at step **3735**, displays only  
20 account balances for the selected stock in the Account Balances display. The user then selects, at step **3740**, the desired account activity from the Account Balances display. The application highlights the item for actions (e.g., more details, print) by the user. To hide the account balances, the user selects, at step **3745**, the "Accounts" function **1550** from the

function bar. At step 3750, the application removes the Account Balances display and removes the indication from the Account Balances function.

FIG. 38 is a flow diagram illustrating software which enables a user to receive and view e-mail messages for account activity functions. Initially, at step 3810, the user undertakes an operation that results in activity in his account. The replica server, at step 3815, detects said activity and generates a structured e-mail message. At step 3820, the replica server sends the structured e-mail message to the user's application in two parts, a summary stream and a detailed stream. The application receives and displays at step 3825, the summary e-mail message in the status display in the stock summary display (see FIGS. 5 & 12), in color-coded text. If the user does not have the full e-mail display open, the user selects the "E-mail" function, at step 3845, from the function bar. At step 3850, the application displays the full e-mail display in the master trade screen. To hide the e-mail display, the user selects the "E-mail" function, at step 3855, from the function bar. The application removes the e-mail display, at step 3860, and removes the indication from the "Email" function.

The preferred embodiment also enables the user to use the stock summary display fields to call only e-mail on desired stocks. Initially, at step 3875, the user selects a stock from the stock summary display and then selects the "E-mail" function. The application transmits the user's preference to the replica server, which updates the user's preference file, and transmits e-mail messages for the selected stock back to the user's application. The application, at step 3880, displays e-mail for the selected stock in the "E-mail" display. At step 3885, the user selects the desired e-mail item directly from the "E-mail" display. The application highlights the selected item for actions (e.g., more details, print) by the user.

FIG. 39 is a flow diagram illustrating software which enables a user to view and select the best price for the same stock sold in several markets. Initially, at step 3910, the user makes the decision to seek the best price for the same stock that is trading in several different markets. At step 3915, the user selects the "Best Price" function. The application shows the simplified trade screen at step 3920. The user inputs the symbol for the stock, at step 3925, the quantity, and whether he wants a buy price or a sell price. The application transmits the user's request to the replica server. The replica server searches its database which contains stock market information updated in real-time. The replica server then transmits information for that stock to the user's application, which, at step 3930, displays information on alternate markets and displays quotes in analog price maps (see FIG. 57) or in alphanumeric format. At step 3935, the user views alternate prices for the same stock and selects a market. At step 3940, the application populates the trade ticket (see FIGS. 5 & 11) with selected market, symbol, price, and quantity information. The user reviews the verification screen, at step 3945, and selects Send order. The application transmits the user's order to the broker/dealer server, which in turn transmits the order to the requested market. In the meantime, at step 3950, the application displays the order transmission status in the message line display. When execution is confirmed, at step 3955, the broker/dealer server notifies the user's application. The application removes the yellow highlight in the open positions display and moves the order to the account history file. The broker/dealer server updates the user's account files, at step 3960, and calculates new balances. The application updates new data in the master trade screen displays.

FIG. 40 is a flow diagram illustrating software which enables a user to view the market in a stock by accessing the visual quote (see FIGS. 5 & 6) and price map display.



Initially, at step **4010**, the user selects a stock from the stock summary display (see **FIGS. 5 & 12**) or by entering the stock symbol in the order book display (see **FIGS. 5 & 6**). The application transmits the user's request to the replica server, which sends the requested information back to the user's application. This information is kept updated in real-time by the

5 replica server. At step **4015**, the application displays the order book visual quote, which includes the following information: (1) prices in descending order; (2) quantities at a given price level; (3) the user's orders at a price level; (4) buy side best price; (5) sell side best price; (6) the bid-offer spread; (7) an alphanumeric quote for the stock; (8) all-or-none orders at price levels; (9) a chart function button; (10) a most active button; (11) the news out indicator;

10 (12) the market open/closed indicator; (13) the symbol entry field; and (14) the compress spread function. If the price map display (see **FIG. 13**) is selected, the display includes: (1) a low-resolution price scale; (2) a closing price in the national market(s); (3) the current spread in the after-hours market; (4) the last sale in the after-hours market; (5) the user's average price on shares held; (6) the user's current P&L; (7) the user's current total position; (8) the

15 user's numeric price average; and (9) the Buy and Sell buttons.

At step **4020**, the user selects the trend chart view (see **FIG. 14**) to review the trend of the stock in the national and after-hours markets. The user makes the decision, at step **4025**, to look at another stock in the detailed book view or chart view, and selects the stock from the stock summary display. The application transmits the user's request to the replica server,

20 which transmits the requested information back to the user's application. This new information is kept updated in real-time by the replica server. The application displays the new stock in the order book view, at step **4030**, and populates the trade ticket (see **FIGS. 5 & 11**). At step **4035**, the application displays news for the selected stock in the stock display. At step **4040**, the application highlights the user's position in the selected stock in the

positions display. The application shows the alert status on the selected stock at step **4045**.

The application also, at step **4050**, shows the selected help function in the background for the selected stock or security type. The application shows profit or loss, at step **4055**, if the user sells his position in the selected stock at the current level shown in the order book display (see

5 **FIGS. 5 & 6**).

As noted, the invention may be used in negotiations between two users relating to the sale of a security. Display screens useful in such negotiations are set forth in **FIG. 41-48**.

**FIG. 41** is the "Set defaults" display for the user-to-user negotiation mechanism of the preferred embodiment. This display allows the user to set parameters to screen out

10 unreasonable (according the user's standards) counteroffers. The user inputs his desired parameters in the boxes **4105**, **4110**, **4115**, and **4120** under questions 1 through 4. In the box **4105** under line 1, the user inputs the price above and below his limit price within which he is willing to negotiate, in increments of sixteenths of a dollar. For example, if his limit price is \$50 per share, and he is willing negotiate at prices between \$49.75 and \$50.25 per share  
15 (depending on whether the order is a buy or sell order), he would enter 0.25 into the box **4105** under question 1. The user enters the number of shares above or below his stated order size that he is willing to negotiate in the box **4110** under question 2. For example, if the user is offering to sell 100 shares, but would consider selling 80-120 shares, he would enter 20 in the box **4110** under question 2. If zero is entered, the order is an all-or-none order. This  
20 negotiation floor and ceiling is expressed alternatively in percentages; see **FIG. 42**. The user enters his default preferred negotiation time in the box **4115** under question 3. For example, if the user would prefer to have 10 minutes to respond to any buy offers, he would enter "10 min." in box **4115**. The user enters the lower time limit he will accept in the box **4120** under

question 4. For example, if the user would not consider any offers which require him to respond in less than 2 minutes, he would enter "2 min." in box **4120**.

The user sets the defaults for the incremental changes caused by clicking the adjustment buttons in the negotiations screen (see **FIG. 42**) by inputting the desired increment sizes into boxes **4125**, **4130**, and **4135** under questions 5, 6, and 7. The user inputs the desired size incremental change to be caused by clicking the size change buttons ("Qty Up" and "Qty Down") (see **FIG. 42**) into the box **4125** under question 5. This size change is shown here in terms of number of shares; alternatively, the size change can be a percentage (see **FIG. 42**). The user inputs the desired time incremental change to be caused by clicking the time change buttons ("Time Up" and "Time Down") (see **FIG. 42**) into the box **4130** under question 6. The user inputs the desired price incremental change to be caused by clicking the price change buttons ("Price UP" and "Price Down") (see **FIG. 42**) into the box **4135** under question 7.

**FIG. 42** is a negotiations screen. Users of the system can undertake direct, real-time on-line negotiations with other traders on the system. The purpose of the negotiations system is to permit traders to attempt to better the price of buying or selling stock as compared against the best bid and offer shown in the order book display. The negotiations screen has three main components: the "Traders at a price level" screen **4200**, the "Out-going negotiations" screen **4205**, and the "In-coming negotiations" screen **4210**. The traders listed in the screen **4200** are called up by double-clicking on a quantity away from the best bid and offer shown in the order book display (see **FIG. 25**). The price corresponding to the quantity double-clicked in the order book display is the price listed in the "Price" column **4260** of the negotiations display traders screen **4200**. In the example shown in **FIG. 42**, that price is 52.5.



shown, the selected trader is Larry 22. The "Best offer" button **4265** is used to arrange the order of the listed buyers or sellers according to the ones which most closely satisfy criteria set by the user. Available parameters include: widest price variation counteroffer; most time allowed; and highest activity level. A "not-to-exceed" field can be selected to limit order size

5 above or below a certain amount. The button **4270** adjacent to the "Best offer" button displays a price 1/16 lower, in this case, from the listed price (52.5). The user can click button **4270** to have the application display parties selling at 52.438. This improves the trading efficiency of the user by not requiring him to return to the order book display and click on a different price. The three buttons to the right of button **4270** work the same way. The "Sort"

10 button **4275** allows the user to specify the parameters according to which the traders are listed; for example, according to price, quantity, or time. The "FIND" bar **4214** at the bottom of the negotiations screen allows a user to modify the negotiations screen display without having to return to the order book display. Clicking on the "Action" button **4216** creates a pop-up menu with the choices "Buy" and "Sell." Clicking the "Stock" button **4222** creates a

15 pop-up menu listing recently checked stocks, along with a box into which the user can input the symbol of a stock not displayed. Entering or selecting a stock pulls up a display of trades in that stock. The first price level displayed is that of one price increment away from the best bid and offer (BBO) as shown in the order book. The user can select price increments above or below the first increment by selection of the price increment buttons. Clicking the "Trader"

20 button **4232** creates a pop-up menu with a box into which the user can input the name of a trader of interest. The application will display the selected trader's current limit order or outstanding negotiations in all stocks in which the trader has limit orders posted. Clicking the "Trader list" button **4242** creates a pop-up "hot list" of traders. This hot list is created by the user using the "Add" button **4252** and the "Delete" button **4262**. Clicking the "Add" button

4252 after the user has typed in the name of a trader using the "Trader" button 4232 adds that trader's name to the "Trader list." Also, if a user has highlighted a trader's name in the "Traders at a price level" display 4200, that user's name is added to the "Trader list" when the "Add" button 4252 is clicked. Clicking the "Delete" button 4262 when a trader's name in the "Trader list" removes that trader's name from the Trader list. When the user highlights a selection of trader names in the Trader list and hits "Enter," the "Traders at a price level" screen 4200 displays the selected traders and the selected stock, along with those traders' outstanding offers in that stock.

When a user enters a limit order by using the trade ticket, he has the option (by checking the "Negotiations allowed" box on the trade ticket display – see FIG. 11) to allow negotiations or not. If the user checks the "Negotiations allowed" box, the application will allow the user's order to appear in the negotiations screen. If the "Negotiations allowed" box is not checked, the user's order will not be displayed in the negotiations screen.

The "Broadcast" button 4212 permits a user to send the same offer to more than one trader. The first trader to respond is the one with whom the user negotiates. The user selects the traders to whom the offer will be sent by highlighting their names in the "Traders at a price level" screen 4200.

FIG. 43 shows how the negotiation screen 4200 fits into the master trade screen (see FIG. 5). The user requests the negotiation display by selecting a negotiation button 1530. In response, the application displays at 4200 the negotiation screen as discussed in connection with FIG. 42.

FIG. 44 illustrates how a user adjusts the values in his counteroffer. Once Larry 22's trader line 4255 has been selected and double-clicked, a copy 4415 of his trader line appears

in the Out-going Negotiations screen **4205**. The activity level of the trader is displayed, along with the identity **4425** of the stock to which the activity level refer. This helps the user keep clear which stock he is making offers and counteroffers on, and is especially helpful when several offers on different stocks have been made. The user in the example illustrated in **FIG.**

5 **44** is RON-3, and the "counter-line" below Larry 22's line **4415** is highlighted in yellow and automatically pre-filled with the user's name and related data. If the Speed Function is used (by holding down the Shift key when line **4255** is double-clicked), the counter-line is filled with Larry 22's minimum values.

The size change buttons **4240** are used to adjust the value **4410** displayed in the user's

10 counter-line **4405**. The size buttons **4245** are used to adjust the number of shares **4420** displayed in the user's counter-line **4405**. The time buttons **4250** are used to adjust the time values **4430** displayed in the user's counter-line **4405**. The numbers shown in parentheses in the user's counter-line are the default values set in the "Set defaults" display (see **FIG. 41**). The user can adjust these values by directing typing over them in the counter-line **4405**.

15 **FIG. 45** illustrates how the application displays the potential effect of a user's counteroffer. Once the price, quantity, and time parameters are set for the user's counteroffer, the application displays the cost **4520** of the user's proposed transaction (if the transaction is a purchase; if the transaction is a sale, the price to be received for the shares would be displayed – see **FIG. 47**). The number 93.50 **4725** in the P/L column is the difference between what the  
20 user would pay at the best ask price displayed on the system and what the user would pay at the price per share in that negotiations row. In the example shown, the best ask price per share is assumed to be 52.187. Thus, if the user buys 500 shares at 52, he will **4725** pay \$93.50 less than he would have paid at the best bid price.

**FIG. 46** illustrates how an offering trader responds to a user's counteroffer. The trader in the example, Larry 22, has made a counteroffer **4610** ("Counter 2") to the user's Counter 1 offer. Larry 22 has responded with an offer to sell at 52.25 **4615** instead of 52, to sell 800 shares **4620** instead of the 500 the user offered to buy, and has specified a response time **4625** of 1 minute. The application displays Larry 22's level of trading activity **4640**, and displays the amount **4630** the user would have to pay to accept Larry 22's counteroffer.

**FIG. 47** illustrates how a user makes an offer to sell and then receives buy counteroffers. In the example, the user is RON-3. The user has made a sell offer **4710**, which is displayed in the In-coming negotiations screen **4210**. The user is offering to sell 2000 shares of the stock whose symbol is "T" **4750**, at a price per share of 152.5, and would prefer to have 10 minutes to consider counteroffers. Further, the user is only willing to consider counteroffers of 152 per share or above, of at least 1000 shares, and demands at least 2 minutes to consider such offers. If the user's offer to sell is accepted as is, the user would sell his 2000 shares for \$305,000. The number 1,567 **4725** in the P/L column is the difference between what the user would receive at the best bid price displayed on the system and what the user would receive at the price per share in that negotiations row. In the example shown, the best bid price per share is assumed to be 153.284. Thus, if the user sells his 2000 shares at 152.5, he will **4725** receive \$1,567.00 less than he would have received at the best bid price. The counteroffer **4720** has been made by Fred 4U. He is offering to buy 1000 shares at 152 per share and requests a response in 2 minutes. Note that these are the minimum values of the user's offer, so Fred 4U may have used the speed function to initiate his counteroffer. The application has calculated the dollar amount of Fred 4U's counteroffer and displayed that value in the "Total \$" column.



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**FIG. 48** illustrates how the preferred embodiment enables a user to conduct more than one in-coming negotiation and more than one out-going negotiation simultaneously. In the example shown, the user, RON-3, has an out-going negotiation **4810** with Larry 22 on shares of IBM stock. The user also has an out-going negotiation **4820** with Frank5 on shares of DELL stock. At the same time, the user has two in-coming negotiations. The first is a negotiation **4830** with Fred 4U for shares of T stock. The second in-coming negotiation **4840** is with David44 for shares of YHOO stock. Although it would be obvious to one of ordinary skill in the art to modify the preferred embodiment to enable a user to conduct more than 4 negotiations at once, the preferred embodiment is restricted to displaying only two incoming and two outgoing negotiations so as to maximize the trading efficiency of the user.

**FIGS. 48A and 48B** show a flow diagram illustrating how the system enables one user to negotiate with another user. Step **4832** involves a seller activating the application and viewing the order book for a particular stock. This done the same as for a standard buy or sell order, by following steps **310** through **338** as described in **FIG. 3**. At step **4842**, the seller wishes to sell 1000 shares of IBM at \$50.25 per share. The user fills in the trade ticket **510** with the relevant information, and checks the box for "Negotiations allowed" **1175**. The seller then the send order button (the "Verification" button **1110**). The final verification screen is displayed at step **4844**, and the seller selects the "Send" order button. At step **4846** the seller's order is transmitted to the seller's broker/dealer server/database, which checks that seller has at least 1000 shares of IBM available to sell. The broker/dealer server/database sends the approved sell order (with a user account ID and the size, price, stock, and side (whether buy or sell) of the order) to the root server **50**, which attaches a system ID to the order, said system ID containing sufficient information to enable the system to match the ID to the seller,

the order, and the seller's broker/dealer. At step **4852**, the root server accepts the seller's order and updates the IBM order book in the master database to reflect the seller's order. The updated order book is transmitted at step **4854** to the replica servers **30**, which update the replica databases. At step **4856**, each replica server/database with connected users which

5 subscribe to the IBM order book sends seller's sell offer (along with the system ID of the seller's offer), along with any other updated order book information, to the IBM subscribers' applications. At step **4858**, the applications which receive the seller's sell offer display that offer in the context of the IBM order book display. At step **4862**, a buyer sees from the IBM order book display that the best ask price for IBM is 50 3/16, but there is only one offer at

10 that price, the offer is to sell only 200 shares, and the buyer wishes to buy 1000 shares of IBM. At step **4864**, the buyer sees in the order book display that there are more than 1000 shares for sale at 50.25. The sell orders at 50.25 are aggregated in the order book display, and the seller's order is included in that aggregation. At step **4868**, the buyer decides to try to negotiate, so he clicks on the price \$50.25 in the order book display. The negotiations screen

15 **4200** is displayed at step **4872**, with sell offers of IBM stock at \$50.25 displayed, including the seller's offer to sell 100 shares of IBM at \$50.25. At step **4874**, the buyer clicks on the seller's offer that is displayed in the negotiations screen. The seller's offer is then re-displayed in the out-going negotiations display **4205** in line **4280**. At step **4876** the buyer enters a counteroffer to seller's offer into the line **4285** below the seller's offer as displayed in line

20 **4280**, offering to buy 1000 shares of IBM stock at 50 3/16. The buyer then selects the "Send" button at step **4882** to send his counteroffer to seller. At step **4882** the application sends the buyer's counteroffer to the buyer's broker/dealer server/database, which then checks the amount of uncommitted funds in the buyer's account and sends the buyer's account limit

information back to the application. The application at step **4884** checks to see whether the buyer's counteroffer is permissibly under the limits on the buyer's account. At step **4886**, if the buyer's counteroffer is determined by the application to be acceptable, the application transmits the buyer's counteroffer to the replica server, along with the system ID of the  
5 seller's offer and the broker/dealer account ID for buyer. The replica server at step **4888** transmits the buyer's counteroffer, seller's offer's system ID, and buyer's broker/dealer account ID to the root server, which then updates the IBM order book in the master database and assigns a system ID to the buyer's counteroffer. The updated order book information, including the buyer's counteroffer to seller and the system ID for seller's offer, is then  
10 transmitted at step **4890** to the replica servers, which update the replica databases. The replica server connected to seller transmits buyer's counteroffer to seller's application, along with the system IDs of the seller's offer and the buyer's counteroffer. At step **4892**, the seller's application displays the buyer's counteroffer as an incoming negotiation and the seller accepts the buyer's offer by selecting the "Accept" button (see **FIG. 47**). If the buyer's counteroffer  
15 has affected the prior account approval of seller's offer by the seller's broker/dealer (say, e.g., that buyer had offered to buy 2000 shares and seller accepted), seller's acceptance would be first be routed to seller's broker/dealer for approval before the application would transmit the acceptance to the replica server. At step **4894**, the seller's acceptance order, including the system IDs of the seller's original offer and the buyer's counteroffer, is transmitted by the  
20 seller's application to the replica server **30**, which transmits the order to the root server **50**. At step **4896**, the root server updates the master database, including the IBM order book; uses the system IDs of the buyer's counteroffer and the seller's original sell offer to notify the seller's broker/dealer server and the buyer's broker/dealer server of the nature of the approved transaction; and transmits updated order book information to the replica servers. Step **4998** is

the final step of closing the transaction, and is the same as steps 394 and 398 of FIG. 3. In an alternate embodiment of the negotiations system and method, all buy sell orders and all offers and counteroffers are routed through and approved by the broker/dealer(s) in a manner analogous to that described in FIG. 3.

5        Several additional displays that are useful in the practice of the invention are shown in FIG. 49-62.

FIG. 49 is a "most viewed stocks" display. The most viewed stocks display is displayed in the same part of the master trade screen as the order book display, the multiple pricing map display, and the chart of stock activity display (see also FIG. 57B). The bars 10 4910 represent the number of participants in the system who have recently viewed the listed stocks. As a default, the stocks are listed in descending order of the number of shares traded in the most recent period. The user can enter the symbol into the box 4920 of a stock of interest that is not displayed in order to have that stock displayed at the top of the Most viewed stocks display. The advantage of the most viewed stocks display is that it enables a 15 user to determine what stocks other users have been checking. This in turn aids the user to determine, for example, what stocks he needs to be searching for news reports on.

FIG. 50 is a fully compressed view of the GUI of the application (see FIG. 16). A frequent problem with current on-line trading systems is the need for the user to open up an entire browser to view the status of stocks of interest. Such a process wastes time and 20 requires the user to rearrange his screen work space or cover other work while viewing the status of stocks of interest. FIG. 50 shows the fully compressed stock display that can be displayed on the user's screen at all times while not obstructing the user's workspace. The component is a real-time display that shows the current status of user-defined stock portfolios, indexes, or any other electronically delivered status indicators. The "On Line" indicator 5005

shows whether or not the user is connected to the system. If the "Help" button **5010** is selected, context-sensitive help data is displayed. Selection of a stock followed by selection of the "Trade" button **5015** opens the master trade screen to the fully expanded position with the selected stock shown in the order book and the trade ticket populated. Selecting the "Quote" button **5020** calls up the "Quick Quote" screen (see **FIG. 51**). The "News" button **5025** flashes if news is out on any stocks on which alerts have been set. The "Messages" button **5030** flashes when the user has e-mail messages, and clicking the button opens the e-mail window. Clicking the "Expand" button **5035** opens the stock summary display (see **FIG. 16**) and closes the compressed display. Clicking the "Close" button **5040** closes the compressed display and closes the application. Rows **5050** and **5060** display three stock data fields each. The user can type a stock symbol in a data field and receive current status information on that stock. The fields can contain stocks, mutual funds, bonds, any security, index, or related variable. If the user has set visual alarms for a stock displayed in a data field, the background of that field will highlight based on user-defined criteria.

**FIG. 51** shows a "Quick Quote" display. The default display **5100** is called up when the user selects the "Quick Quote" button from the function button display (see, e.g., **FIG. 5**). The user types the symbol for the desired stock in the box **5114** and selects the "Show quote" button **5112** to have data on the stock displayed in the screen **5120**. If the user selects the "Trade ticket" button **5126**, the trade ticket **510** is pre-filled with the appropriate data on the selected stock, including the user's positions if applicable. If the user selects the "Add to wish list." button **5128**, the stock is added the user's wish (watch) list for further monitoring. If the user selects the "New Quote" button **5122**, an empty quote screen **5100** is displayed. If the user selects the "Show News" button **5124**, the news window is opened and news on the

selected stock is displayed. If the user does not know the correct symbol for the stock, he can enter the name of the company into the box **5116**, and then click on the "Find symbol" button **5118**. If the company name is not a perfect match with one listed in the master database of the system, the screen **5140** is displayed, with the closest matches **5148** to what the user has typed in displayed. The scroll bar **5150** allows the user to scroll up and down the list of companies. The "New Search" button **5144** calls up the screen **5100**. If a company name is selected from the list, the "Show quote" button **5146** calls up the screen **5120**, with the stock data for the selected company displayed.

**FIG. 52** shows a "Stock alert set up" display, which allows a user to track the movement of selected stocks. The user calls the stock alert set up display by selecting the "Alerts" button **1525** in the function button display (see **FIG. 15**). If a stock is first selected from the stock summary display (see **FIG. 12**) and then the "Alerts" button is selected, the "Stock alerts set up" screen is pre-filled with information from the user's positions and the current status of the stock in the market. If the stock symbol is not pre-filled into the box **5210**, the user inputs the symbol for the stock of interest. Once the symbol is input, the current price **5212** of the stock is automatically filled in by the application. The user inputs the price at which he wants to be alerted in the box **5215**. The user selects the method by which he wishes to be alerted in the column **5220**, by checking the appropriate box **5222**. Available options include: pager, email, fax, and phone. The user enters his pager number in the box **5230**; his email address in the box **5232**; his fax number in the box **5234**; and his phone number in the box **5236**. If the user selects "Type of Alerts" **5240** and then "visual alerts," the user can have the application highlight the stock in the stock summary display according to various criteria: direction of movement, rate of movement, profit/loss against the user's

current positions. The visual alert works on several of the displays where the stock symbol occurs. The "Other criteria" button **5260** calls up a list of alert criteria options for tracking the status of the stock of interest. The "New alert" button **5242** clears the screen for the input of a new stock symbol or new alert parameters. The "Clear alert" button **5244** cancels an alert  
5 that has already been set. The "OK" button **5250** records the alert that has been set and removes the "Stock alert set up" screen.

**FIG. 53** shows a connection status indication display. Current on-line trading systems do not provide users with a clear, concise status indication of the initial connection process as they log on to the trading system. The connection status display **5300** of the preferred  
10 embodiment shows users each step of the connection process. The first connection status indicator **5320** "Connecting to [the trading system]," is indicated by the button **5325** being lit while the connection to the trading system is being established. When the connection is established, the button **5335** opposite the "Connection established" label **5330** is lit. When the application is initialized, the button **5345** opposite the "Application initialized" label **5340** is lit.  
15 Once the application is initialized, the message **5350** "Initialization complete!" is either displayed (if not displayed already) or highlighted (if already displayed). The user's name and password input areas do not appear until the connection to the network is established. The user then enters his user name in the box **5365** opposite the "Enter your user name" label **5360**. The user also enters his user password in the box **5375** opposite the "Enter your  
20 password" label **5370**. The user then clicks the "OK" button **5380** to submit his login information to the system and to close the connection status screen. If the user encounters problems connecting, he can access the context-sensitive help function, including detailed problem FAQs and a troubleshooting index, by clicking the "HELP" button **5390**.

**FIG. 54** shows a compressed spread display (see **FIG. 6**). The compressed spread screen is called up by clicking the "Compress spread" button **656**. The "Compress spread" button **656** compresses the spread, and orders included in the spread, down to one line. The horizontal bar **5460** representing the compressed spread is red. The compressed view shows the last bid, best offer, and a single line spread shown on a red background with white characters. The quantity shown in the red bar is the total price of the spread in one line. "All or none" orders **5440** and **5450** contained within the spread are shown as total amounts. The magnitude **5430** of the spread is displayed numerically in the center of the bar **5460**. The magnitude of the spread is displayed graphically by the vertical bar **5410** on the right side of the display.

**FIG. 55** shows an email display. The email display is displayed within the web browser of the application (see **FIG. 10**). The "Show news" button **5520** is clicked to return to the news display of the browser. The "Show Email" button **5510** is clicked to go from the news display to the email display.

**FIG. 56** shows a "Final Verification" screen. The dark area **5610** flashes to alert the user to the significance of completing this step. A real-time quotation **5670** for the selected stock is displayed. The user's buying power **5640** is displayed, along with **5650** what his balance will be if the trade is executed and what the corresponding commission **5630** will be. The total cost **5620** of the trade is displayed at the bottom of the screen in color-coded characters.

**FIG. 57** shows an analog graphic display for viewing the price of a stock on several markets at one time (see **FIG. 39**). The price scale **5710** is at the left. The numbers 1 **5720**, 2 **5730**, and 3 **5740** represent markets 1, 2, and 3.



**FIG. 57A** is a "Most Active Stocks" display. The most active stocks in both the Day market (NM) and the Nite Market (AHM) are shown. The scroll bar **5782** allows the user to scroll up and down the list of most active stocks.

**FIG. 57B** shows how the most viewed stocks display shown in **FIG. 49** is displayed in the same screen as the Order book display, chart display, and most active stocks display.

**FIG. 57C** shows a multi-screen view created by the "Peel off display" function (see **FIG. 27**).

In an alternate embodiment of the disclosed system, instead of being in a stand-alone application, the GUI is displayed within an Internet web browser, and the application is a Java applet. In the applet version, no software remains resident on the user's computer when the system is not being accessed. The functionality of the various components of the GUI remains essentially the same, except for routine modifications (for example, some functionality may be scaled back to reduce the size and download time of the applet). In each display, the scalable price map display (see **FIG. 14**) is on the right-hand side.

**FIG. 58** shows an applet version of the real-time chart of stock activity display shown in **FIG. 15**.

**FIG. 59** shows an applet version of the most active stocks display shown in **FIG. 57A**.

**FIG. 60** shows an applet version of the most viewed stocks display shown in **FIG. 57B**.

**FIG. 61** shows an applet version of the order book display shown in **FIG. 6**.

**FIG. 62** shows an applet version of the news display shown in **FIG. 10**.

In a further alternate embodiment of the disclosed system, either the entire master trade screen display (see **FIG. 5**), or individual displays (e.g., the order book display, shown in

FIG. 6, or the displays shown in FIGS. 58 - 62), are presented in static versions on the Internet. These static versions of the primary market displays are presented in the form of "graphic snapshots" in a standard format such as GIF. These snapshots are transmitted and displayed in standard HTML pages without the need to call Java applets or to utilize other secondary implementation strategies. This allows the displays to be widely distributed over the Internet without requiring users to have the latest updated browsers. It further allows for very wide distribution of the market indications to a broad audience such as would be available at a portal or other high-traffic website.

Other embodiments of the disclosed system will be clear to those skilled in the art.

The present invention is not to be limited in scope by the specific embodiments described herein. Indeed, modifications of the invention in addition to those described herein will become apparent to those skilled in the art from the foregoing description and accompanying figures. Doubtless, numerous other embodiments can be conceived that would not depart from the teaching of the present invention, which scope is defined by the following claims.

## CLAIMS

What is claimed is:

1. A method of trading securities on a user-to-user trading system comprising:

(a) electrically receiving over a network a request from a first user to view

5 offers to purchase and offers to sell a first security;

(b) electronically transmitting over the network to the first user data

representing the offers to purchase and the offers to sell the first securities made by some of the users of the system;

(c) electronically updating the data representing the offers to purchase and

10 the offers to sell the first security in response to a new offer to purchase or a new offer to sell the first security received over the network, and transmitting the updated data to the first user, without receiving a request for updated data from the first user; and

(d) electronically receiving an acceptance of one of the offers to sell from the first user and in, response, electronically updating the data representing the offers to sell.

15

2. The method of claim 1 further comprising electronically receiving an offer to sell from the first user and electronically updating the data representing the offers to sell the first security so as to include the offer to sell received from the first user.

20

3. The method of claim 1 further comprising storing the data representing the orders to sell and the orders to purchase the first security at a master database of a root server.

4. The method of claim 3 further comprising storing the data representing the offers to sell and the offers to purchase at a plurality of replica servers connected by a network to the root server.

5. The method of claim 4 further comprising establishing a connection between one of the replica servers and computer equipment of the first user.

6. The method of claim 4 wherein the step (c) of electronically updating further comprises:

(a) electronically receiving the new offer from a second user at a replica server to which the second user is connected;

(b) electronically providing the new offer from the replica server to the root server;

(c) electronically updating the master database stored at the root server based on the new offer;

(d) electronically providing the new offer to the replica servers; and

(e) updating databases stored at the replica servers based on the new offer.

7. The method of claim 1 further including receiving a request from a second user to negotiate purchase price of the first securities offered by the third user and electronically establishing a negotiation between the second and the third users.

8. A computer program for providing a computer interface facilitating user-to-user security trading service for users communicating over a network with a computer system,

the interface comprising: (a) a computer display of orders to buy certain securities at different prices based on data transmitted over the network by at least some of the users of the service; and (b) a computer display of offers to sell the certain securities at different prices based on data transmitted over the network by at least some of the users of the service.

5

9. The program of claim 8 wherein the network is the Internet.

10. The program of claim 9 wherein the users are individuals.

10 11. The program of claim 8 further including software for providing a computer display of a graphical representation of a range of prices offered for the certain securities in the user-to-user trading.

12. The program of claim 8 further including software for displaying offers to buy  
15 or offers to sell provided by a particular user.

13. The program of claim 8 further including software for displaying a negotiation process between two users in connection with purchasing a number of the certain securities, including means for displaying an electronic form for entering a counter-offer.

20

14. The program of claim 8 further including software for displaying a button for accepting an offer.

15. The program of claim 8 further including software for displaying a graphical display of a price of the certain securities paid by a user.

16. A computer program for providing a computer interface which facilitates  
5 security trading by a user communicating over a network with at least one computer system, the interface comprising simultaneously displayed non-overlapping computer displays which include: (a) a computer display of user's current security positions, (b) a computer display of an open order list of the user, (c) a computer display of a trade ticket, (d) a computer display of a watch list of securities wherein a price of at least one of the securities displayed in the  
10 watch list is automatically updated without the user requesting each update.

17. The program of claim 16 further providing a computer display of offers to buy and offers to sell the securities.

18. The program of claim 17 further including software for providing a  
15 simultaneously displayed non-overlapping computer display of news items.

19. The program of claim 18 further including means for pre-filling the trade ticket.

20. The program of claim 19 further including software for simultaneously  
20 displaying non-overlapping computer display of performance of the securities.

21. An article of manufacture storing a computer program for providing a computer interface facilitating user-to-user security trading service for users communicating

over a network with a computer system, the interface comprising: (a) a computer display of orders to buy certain securities at different prices based on data transmitted over the network by at least some of the users of the service; and (b) a computer display of offers to sell the certain securities at different prices based on data transmitted over the network by at least  
5 some of the users of the service.

22. The article of claim 21 wherein the network is the Internet.

23. The article of claim 22 wherein the users are individuals.

10 24. The article of claim 21 wherein the program further provides a computer display of a graphical representation of a range of prices offered for the certain securities in the user-to-user trading.

15 24. The article of claim 21 wherein the program further provides a display of orders provided by a particular user.

25. The article of claim 21 wherein the program further provides a display of a negotiation process between two users in connection with purchasing a number of the certain  
20 securities, including an electronic form for entering a counter-offer.

26. The article of claim 21 wherein the program further provides a computer display of a button for accepting an offer.

27. The article of claim 21 wherein the program further provides a graphical display of a price of the certain securities paid by a user.

28. An article of manufacture storing a computer program for providing a  
5 computer interface which facilitates security trading by a user communicating over a network with at least one computer system, the interface comprising simultaneously displayed non-overlapping computer displays including: (a) a computer display of user's current security positions, (b) a computer display of an open order list of the user, (c) a computer display of a trade ticket, (d) a computer display of a watch list of securities wherein a prices for at least  
10 one security is automatically updated without the user requesting each update.

29. The article of claim 28 wherein the program further provides a computer display of offers to buy and offers to sell securities entered in a user-to-user trading.

30. The article of claim 28 wherein the program further provides a simultaneously  
15 displayed non-overlapping computer display of news items.

31. The article of claim 45 wherein the program further provides means for pre-filling the trade ticket.

20

32. The article of claim 45 wherein the program further provides a simultaneously displayed non-overlapping computer display of performance of the securities.



33. A computer program for providing a computer interface which facilitates electronic security trading by a user communicating over a network with at least one computer system, comprising: (a) software for graphically displaying bid, ask, and spread for a security in active trading in a first market; and (b) software for simultaneously graphically displaying a trade for the security in a second market in such a manner that a value of the trade in the second market can be readily visually compared with the bid, ask, and spread in the first market.

34. The program of claim 33 wherein the trade in the second market is the last trade in the second market.

35. The program of claim 33 further comprising software for simultaneously graphically indicating user's position in the security based on the average price of shares held in user's account such that the indicated user's position can be readily visually compared with the displayed value of the trade in the second market and the bid, ask, and spread in the first market.

36. The program of claim 35 further comprising software for displaying an order book display of offers to buy and offers to sell the securities so as to enable the user to see how the security is trading on a user-to-user system.

37. The program of claim 36 wherein the order book comprises a column indicating price, columns indicating buy side offers, and columns indicating sell side offers.

38. The program of claim 33 further comprising software for displaying an alphanumeric summary of user's average price paid in connection with the security and the user's current profit or loss for the security based on the current price of the security.

5 39. A computer method of providing a computer interface which facilitates electronic security trading by a user communicating over a network with at least one computer system, comprising: (a) graphically displaying bid, ask, and spread for a security in active trading in a first market; and (b) simultaneously graphically displaying a trade for the security in a second market in such a manner that a value of the trade in the second market can  
10 be readily visually compared with the bid, ask, and spread in the first market.

40. The method of claim 39 wherein the trade in the second market is the last trade in the second market.

15 41. The method of claim 39 further comprising simultaneously graphically indicating user's position in the security based on the average price of shares held in user's account such that the indicated user's position can be readily visually compared with the displayed value of the trade in the second market and the bid, ask, and spread in the first market.

20

42. The method of claim 39 further comprising displaying an order book of offers to buy and offers to sell the securities so as to enable the user to see how the security is trading on a user-to-user system.

43. The method of claim 42 wherein the order book comprises a column indicating price, columns indicating buy side offers, and columns indicating sell side offers.

44. The method of claim 39 further comprising displaying an alphanumeric  
5 summary of the user's average price of the security and the user's current profit or loss for the security based on the current price of the security.

45. A computer program for providing a computer interface facilitating electronic trading by a user communicating over a network with at least one computer system,  
10 comprising: software for electronically shrinking a master trade display so as to change view to a summary display and display of function buttons in response to a command from the user; software for electronically shrinking the summary display and the display of function buttons so as to change view to only the display of function buttons in response to a command from the user; and software for electronically shrinking the summary display so as to change view to  
15 fully compressed view in response to a command from the user.

46. A computer method for providing a computer interface facilitating electronic trading by a user communicating over a network with at least one computer system, comprising:  
20 electronically shrinking a master trade display so as to change view to a summary display and display of function buttons in response to a command from the user; electronically shrinking the summary display and the display of function buttons so as to change view to only the display of the function buttons in response to a command from the user; and

electronically shrinking the summary display so as to change view to fully compressed view in response to a command from the user.

47. A computer program providing a real-time trading environment to a user  
5 communicating with at least one trading system over the Internet from a user workstation,  
comprising: software resident at the workstation and receiving over the Internet,  
interpreting, and displaying as non-overlapping simultaneously displayed windows at least the  
following data: a) data relating to price quotes for securities, b) data relating to account  
balances, c) data relating to news items regarding securities, and d) data relating to user's  
10 position in securities.

48. The program of claim 47 wherein the security is a stock.

49. The program of claim 47 further comprising means for receiving updates to  
15 the price quotes for at least one security without the user requesting each of the updates and  
means for displaying an updated quote to the user.

50. The program of claim 47 further comprising software for displaying in a  
graphical form market value of a security.

20

51. The program of claim 47 further comprising software for displaying offers to  
buy and offers to sell securities in a user-to-user trading.

52. A method of presenting information about market conditions to a user at a user workstation networked to at least one server comprising:

displaying numerical information representing detailed trading data for a security in a first market;

5 displaying a summary graphical display representing summary trading information for the security in the first market; and

- displaying graphical information on the summary display representing position of the security in a second market.

10 53. The method of claim 52 wherein the second market is a national exchange.

54. The method of claim 52 further comprising graphically displaying data representing user's holdings of the security on the summary display.

15 55. The method of claim 55 further comprising displaying user's P&L in the security.

56. A method of claim 52 further comprising updating the trading data for the security in real-time without a user requesting updates.

20

57. A method of trading securities over a network comprising:  
in response to a user selecting first securities on a display, electronically performing the following steps:

- (a) automatically filling in a trade ticket based on user's holdings in the first securities and user-specified defaults;
- (b) automatically displaying news relating to the first securities, and
- (c) electronically highlighting at least one other item of displayed data relating to the first securities.

5

58. The method of claim 57 further comprising in response to sending an order defined in the trade ticket, displaying a flashing color-coded verification screen representing a desired transaction.

10

59. The method of claim 57 further comprising displaying to the user progress of the order.

60. A computer program for providing a computer interface which facilitates electronic security trading by a user communicating over a network with at least one computer system, comprising: (a) software for graphically displaying trading data for a first security in active trading in a first market; and (b) software for simultaneously graphically displaying a trade for the first security in a second market in such a manner that a value of the trade for the first security in the second market can be readily visually compared with the trading data for the first security in the first market; (c) software for simultaneously graphically displaying trading data for a second security in active trading in a first market; and (d) software for simultaneously graphically displaying a trade for the second security in a second market in such a manner that a value of the trade for the second security in the second

market can be readily visually compared with the trading data for the second security in the first market..

61. The program of claim 60 wherein the trading data for the first security is bid,  
ask, and spread for the first security.

62. The program of claim 61 wherein the trading data for the second security is  
bid, ask, and spread for the second security.

63. The program of claim 60 further comprising software for simultaneously  
graphically indicating user's position in the first security based on price of shares held in user's  
account such that the indicated user's position can be readily visually compared with the  
displayed value of the trade for the first security in the second market and the trading data for  
the first security in the first market.

63. The program of claim 63 further comprising software for simultaneously  
graphically indicating user's position in the second security based on price of shares held in  
user's account such that the indicated user's position can be readily visually compared with the  
displayed value of the trade for the second security in the second market and the trading data  
for the second security in the first market.

64. A computer method for providing a computer interface which facilitates electronic  
security trading by a user communicating over a network with at least one computer system,  
comprising: (a) graphically displaying trading data for a first security in active trading in a

first market; and (b) simultaneously graphically displaying a trade for the first security in a second market in such a manner that a value of the trade for the first security in the second market can be readily visually compared with the trading data for the first security in the first market; (c) simultaneously graphically displaying trading data for a second security in active trading in a first market; and (d) simultaneously graphically displaying a trade for the second security in a second market in such a manner that a value of the trade for the second security in the second market can be readily visually compared with the trading data for the second security in the first market..

10 65. The method of claim 64 wherein the trading data for the first security is bid, ask, and spread for the first security.

66. The method of claim 65 wherein the trading data for the second security is bid, ask, and spread for the second security.

15 67. The method of claim 64 further comprising the step of simultaneously graphically indicating user's position in the first security based on price of shares held by the user such that the indicated user's position can be readily visually compared with the displayed value of the trade for the first security in the second market and the trading data for the first security in the first market.

68. The program of claim 66 further comprising the step of simultaneously graphically indicating user's position in the second security based on price of shares held by the user such that the indicated user's position can be readily visually compared with the



displayed value of the trade for the second security in the second market and the trading data for the second security in the first market.

5

## ABSTRACT

The system and method of the preferred embodiment supports trading of securities over the Internet both on national exchanges and outside the national exchanges. The preferred embodiment supports an improved human interface and a continuous display of real-time stock quotes on the user's computer screen. The ergonomic graphical user interface (GUI) of the preferred embodiment includes several functional benefits in comparison with existing on-line consumer trading systems. In the preferred embodiment, the users are subscribers to a securities trading service offered over the Internet. Preferably, each subscriber to this service is simultaneously connected from his own computer to a first system which provides user-to-user trading capabilities and to a second system which is a broker/dealer system of his/her choice. The system providing the user-to-user trading services preferably includes a root server and a hierarchical network of replicated servers supporting replicated databases. The user-to-user system provides real-time continuously updated stock information and facilitates user-to-user trades that have been approved by the broker/dealer systems with which it interacts. Users of the preferred system can trade securities with other users of the system. As part of this user-to-user trading, a user can accept a buy or sell offer at the terms offered or he can initiate a counteroffer and negotiate a trade.

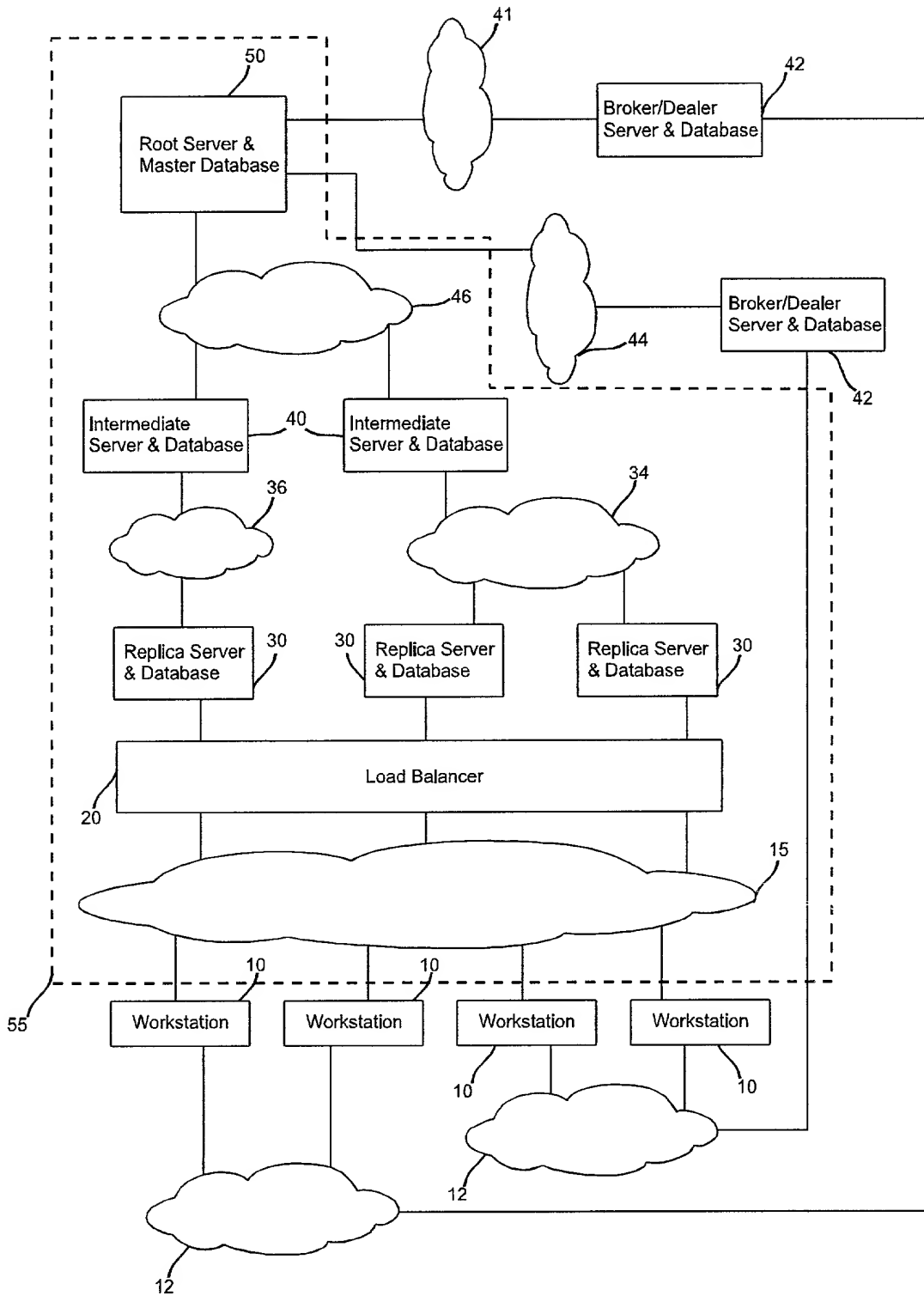


FIG. 1

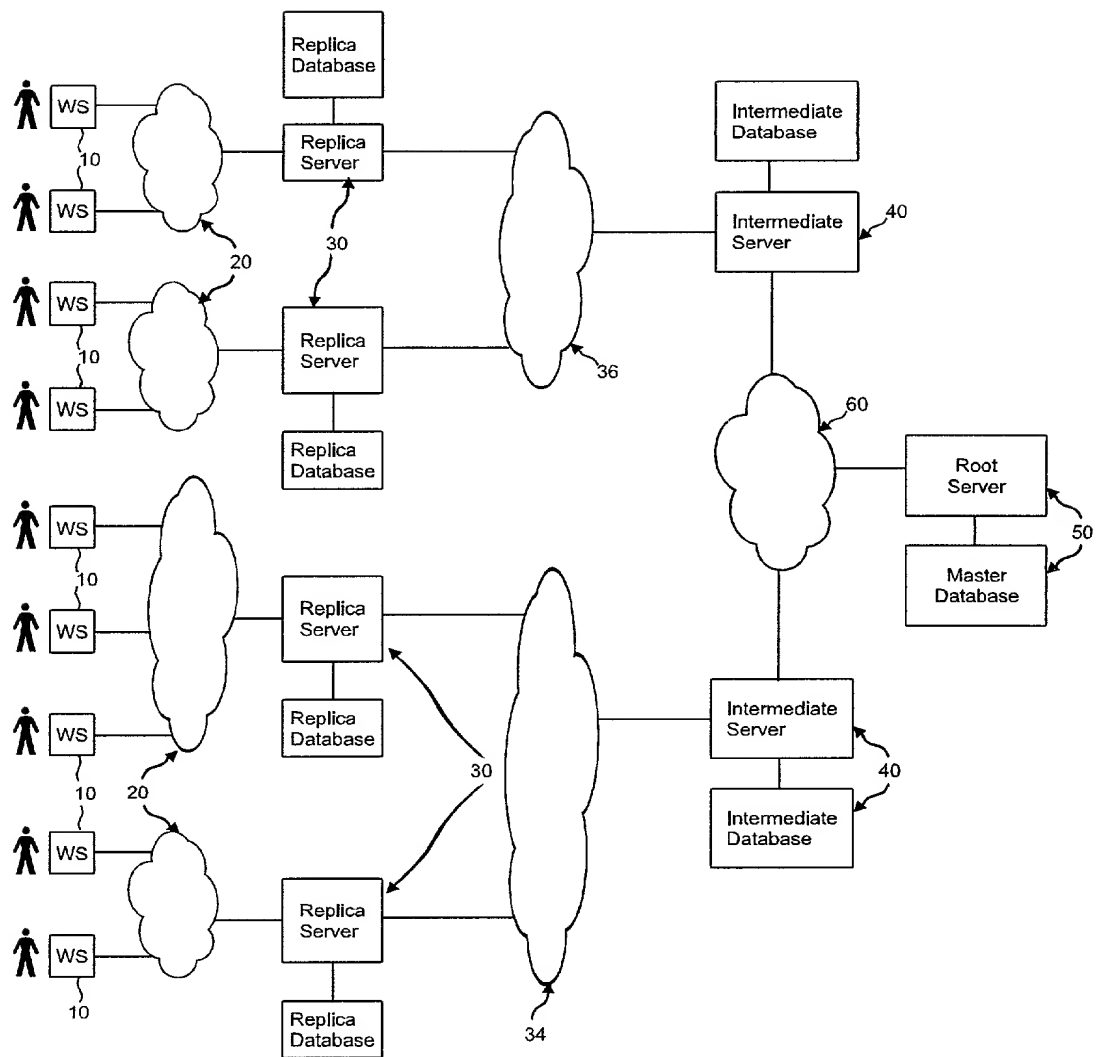


FIG. 2

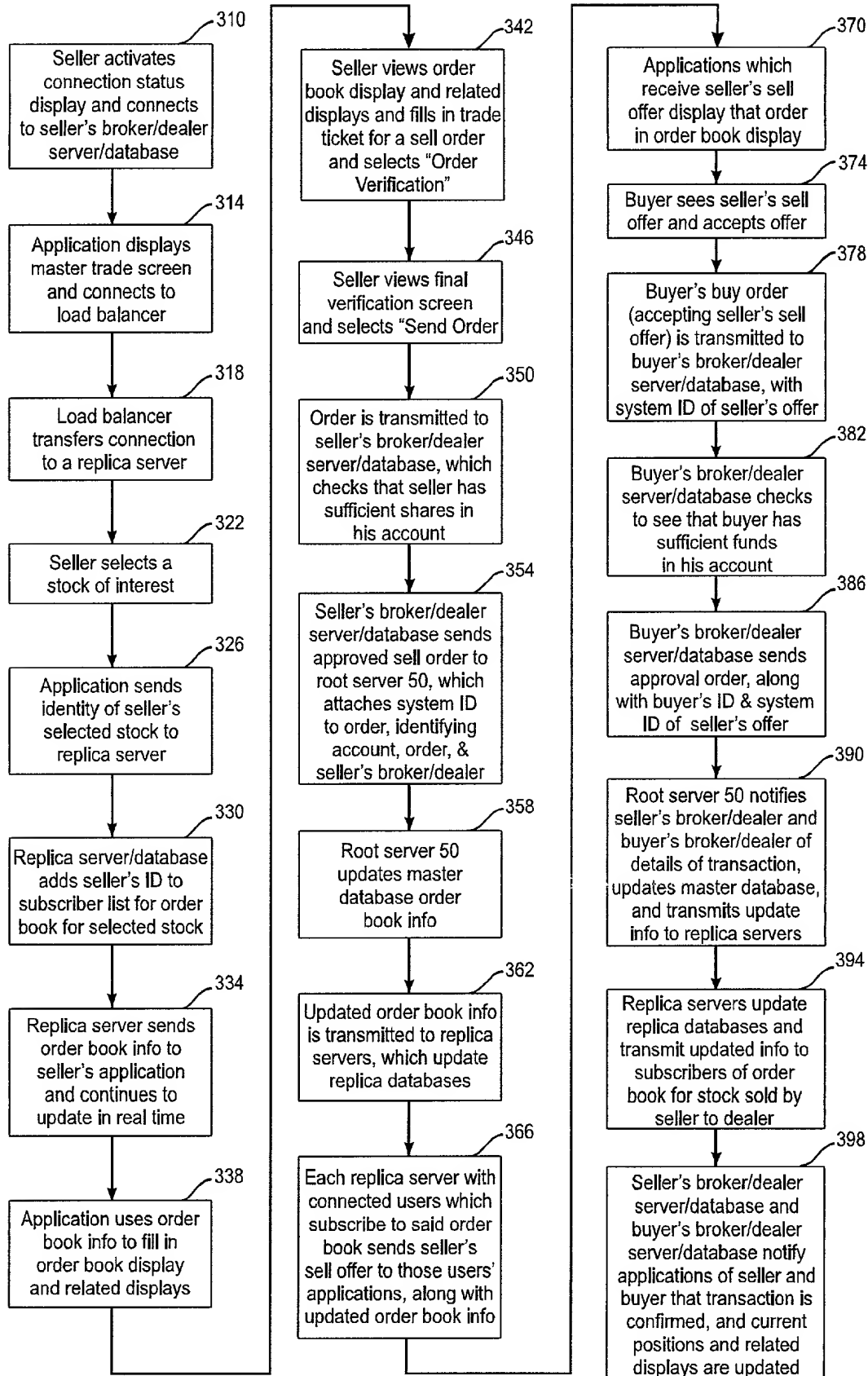


FIG. 3

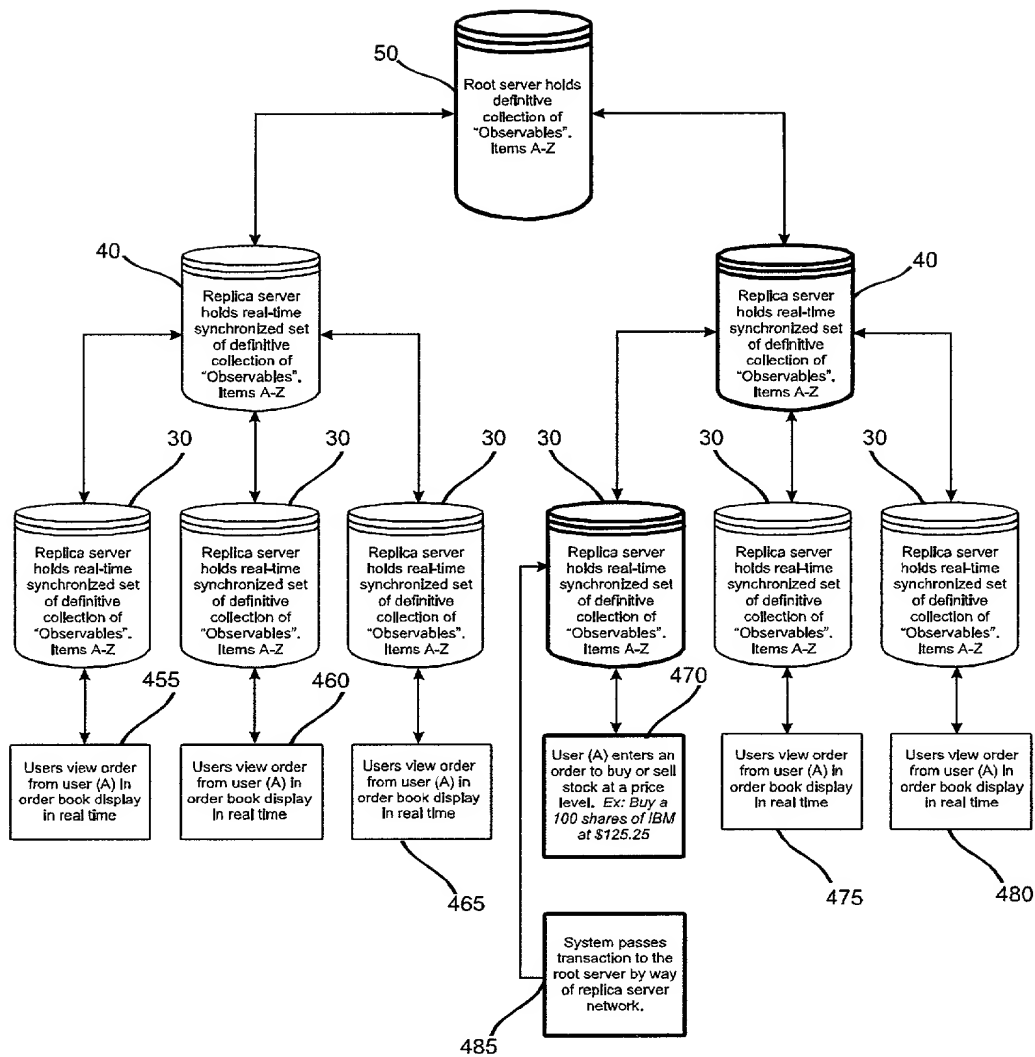
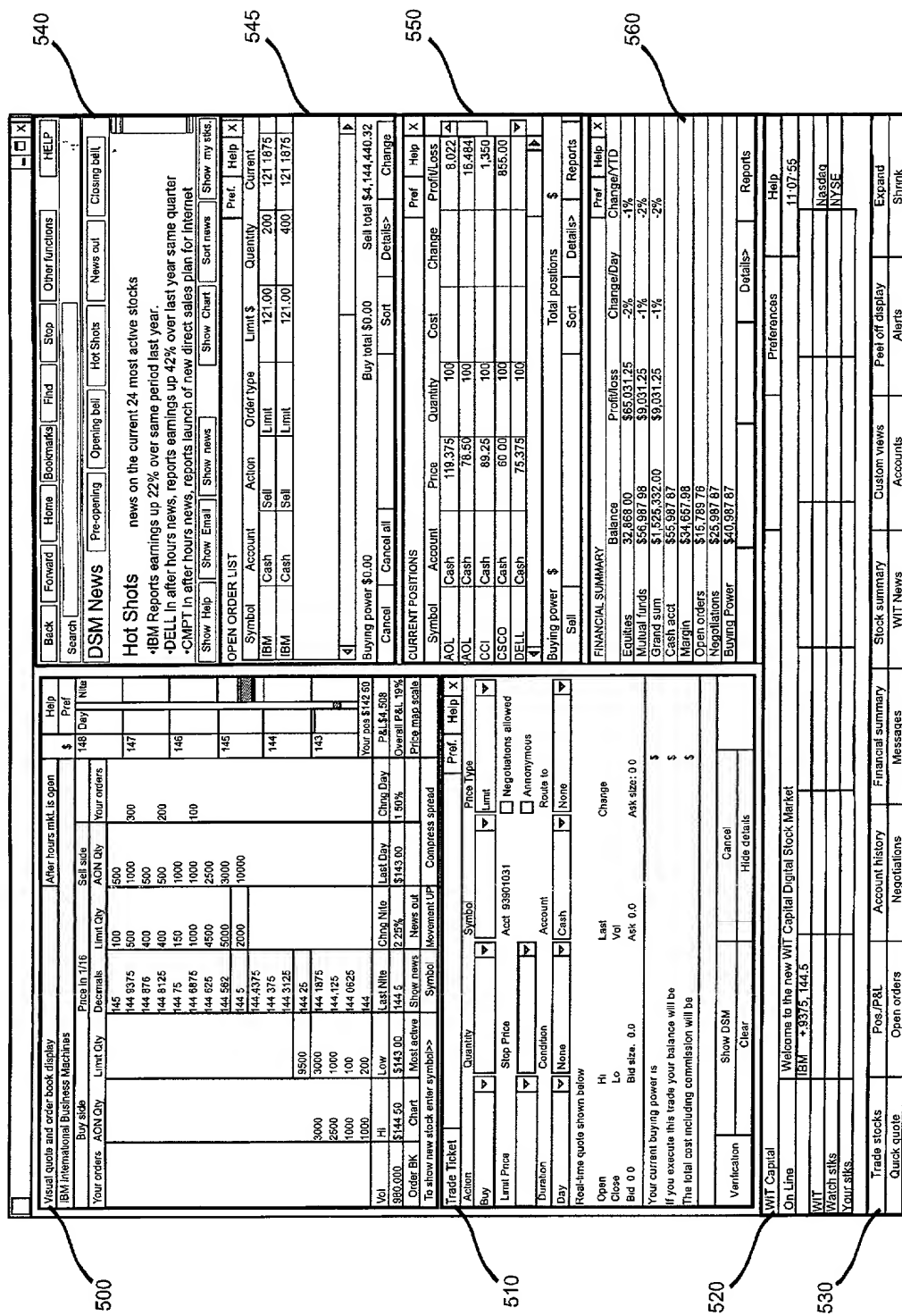


FIG. 4



**FIG. 5**

6  
G.  
F



OPEN ORDER LIST						Pref.	Help	X
Symbol	Account	Action	Order type	Limit \$	Quantity	Current		
IBM	Cash	Sell/N	Limit	121.00	200	121.1875		
IBM	Cash	Sell/N	Limit	121.00	400	121.1875		
◀					▶			
Buying power \$0.00			Buy total \$0.00			Sell total \$4,144,440.32		
Cancel	Cancel all				Sort	Details>	Change	

FIG. 7

450

CURRENT POSITIONS							Pref.	Help	X
Symbol	Account	Price	Quantity	Cost	Change	Profit/Loss			
AOL	Cash	119.375	100	96.25	.23	8062.83			
AOL	Cash	78.50	100	55.00	.24	7006.37			
CCI	Cash	89.25	100	83.5	.06	9355.74			
CSCO	Cash	60.00	100	59	.01	9833.33			
DELL	Cash	75.375	100	65.25	.10	8656.72			
Buying power \$							Total positions \$		
Sell				Sort	Details>	Reports			

810

820

830

FIG. 8

FINANCIAL SUMMARY					Pref.	Help	X
	Balance	Profit/loss	Change/Day	Change/YTD			
Equities	32,868.00	\$65,031.25	-2%	-1%			
Mutual funds	\$56,987.98	\$9,031.25	-1%	-2%			
Grand sum	\$1,525,332.00	\$9,031.25	-1%	-2%			
Cash acct.	\$55,987.87						
Margin	\$34,657.98						
Open orders	\$15,789.76						
Negotiations	\$25,987.87						
Buying Power	\$40,987.87						
			Details>		Reports		

FIG. 9

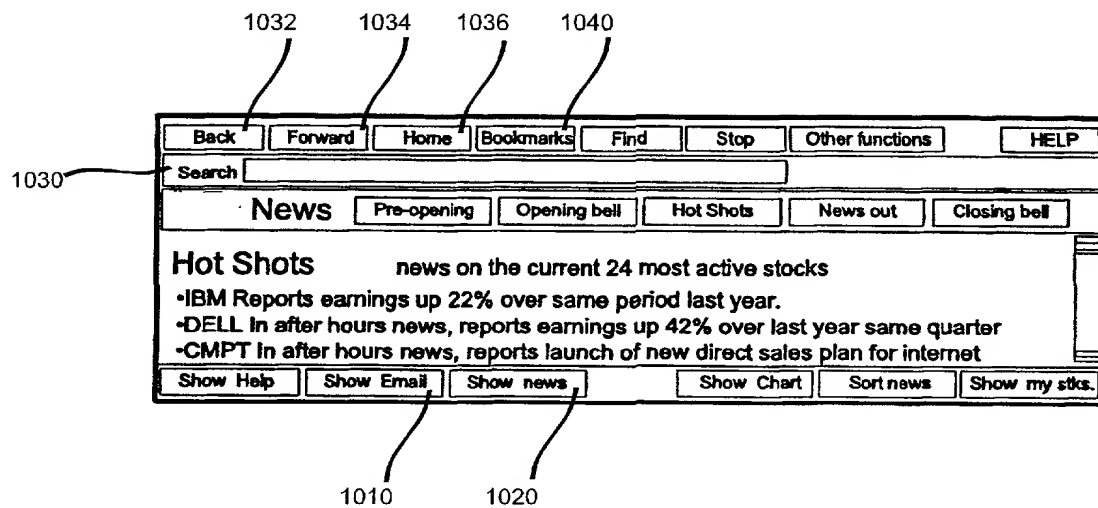


FIG. 10

Trade Ticket

1140 1145 1130 1135 1160

1125

Action Buy Quantity Symbol Price Type Limit

Limit Price Stop Price Acct. 93901031

1175

Duration Condition Account Route to

1180

1150

Day None Cash None

Real-time quote shown below

Open	Hi	Last	Change
Close	Lo	Vol	
Bid: 0.0	Bid size: 0.0	Ask: 0.0	Ask size: 0.0

1112

Your current buying power is: \$

1114

If you execute this trade your balance will be \$

1116

The total cost including commission will be \$

1110 1115 1155 1165 1170

Verification Show DSM Clear Cancel Hide details

FIG. 11

WIT Capital	Welcome to the			Order driver	Preferences	Help
On Line	IBM	+9375	Stock Market			11:07:55
WIT						Nasdaq
Watch site.						NYSE
Your site.						

1210

1220

1230

FIG. 12

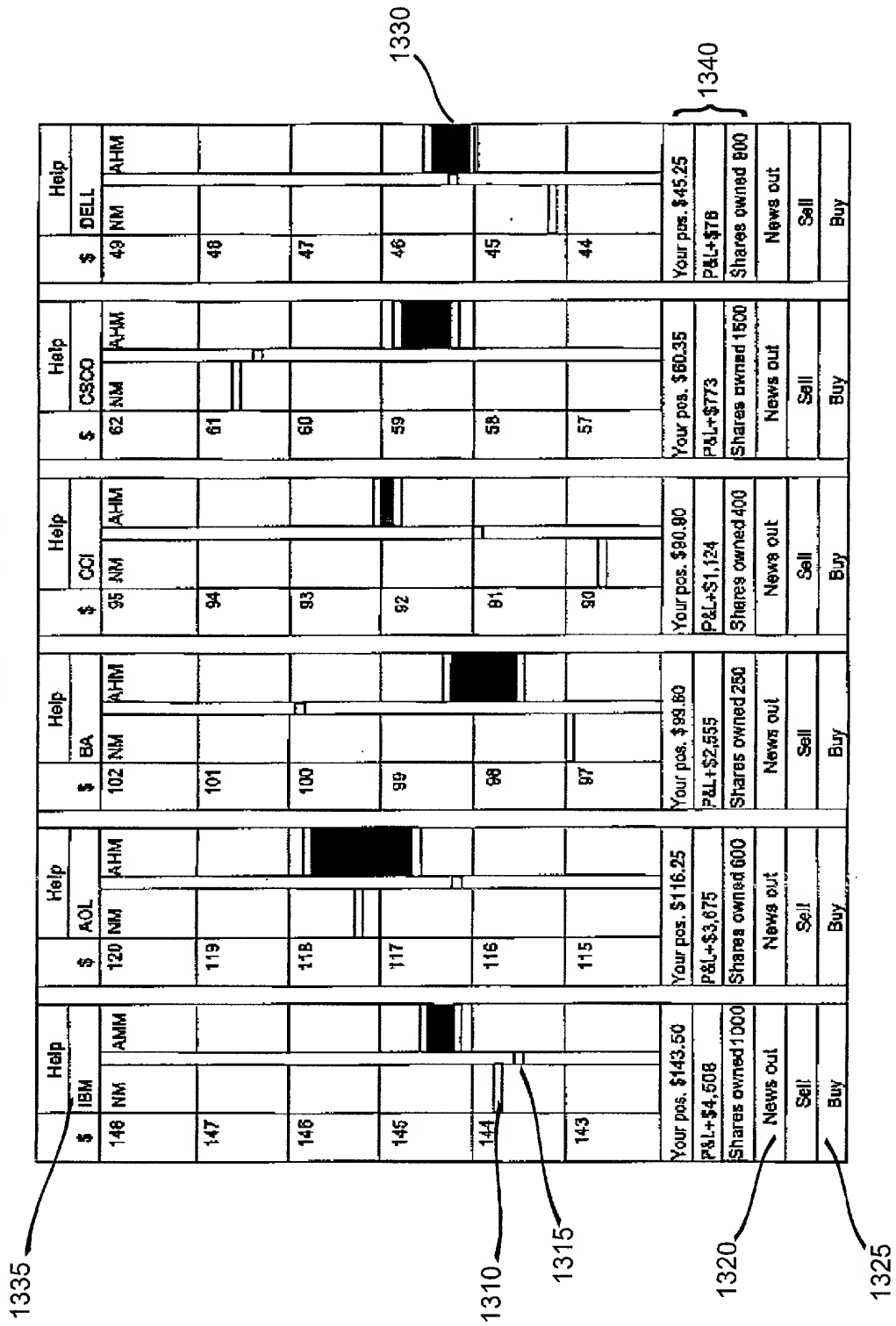


FIG. 13

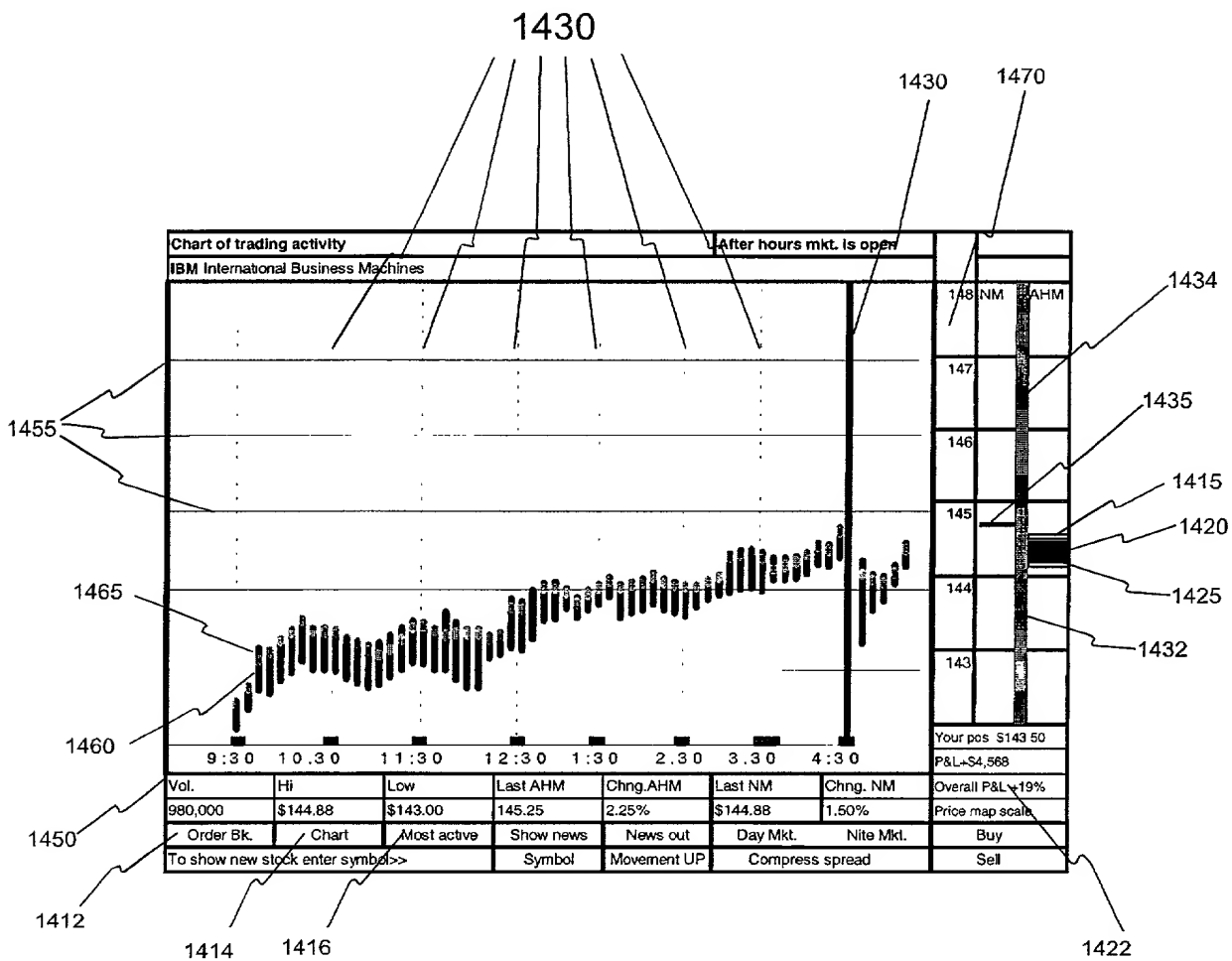


FIG. 14



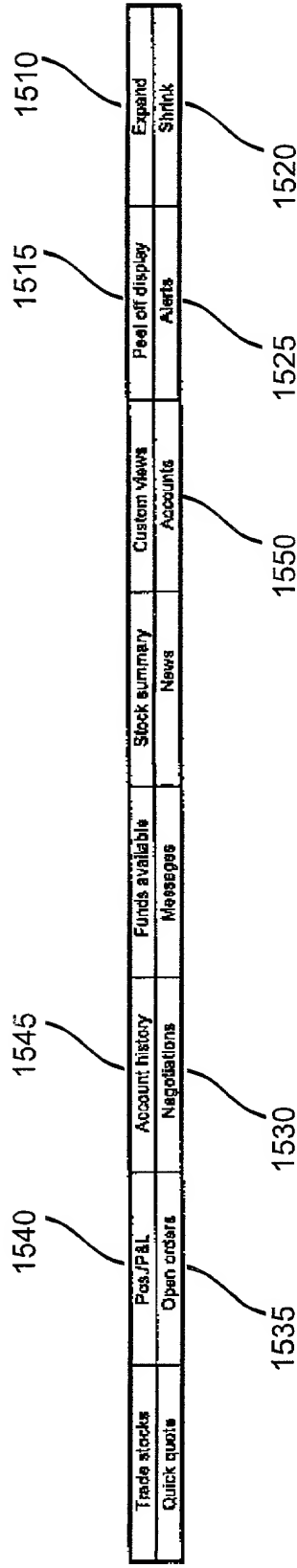
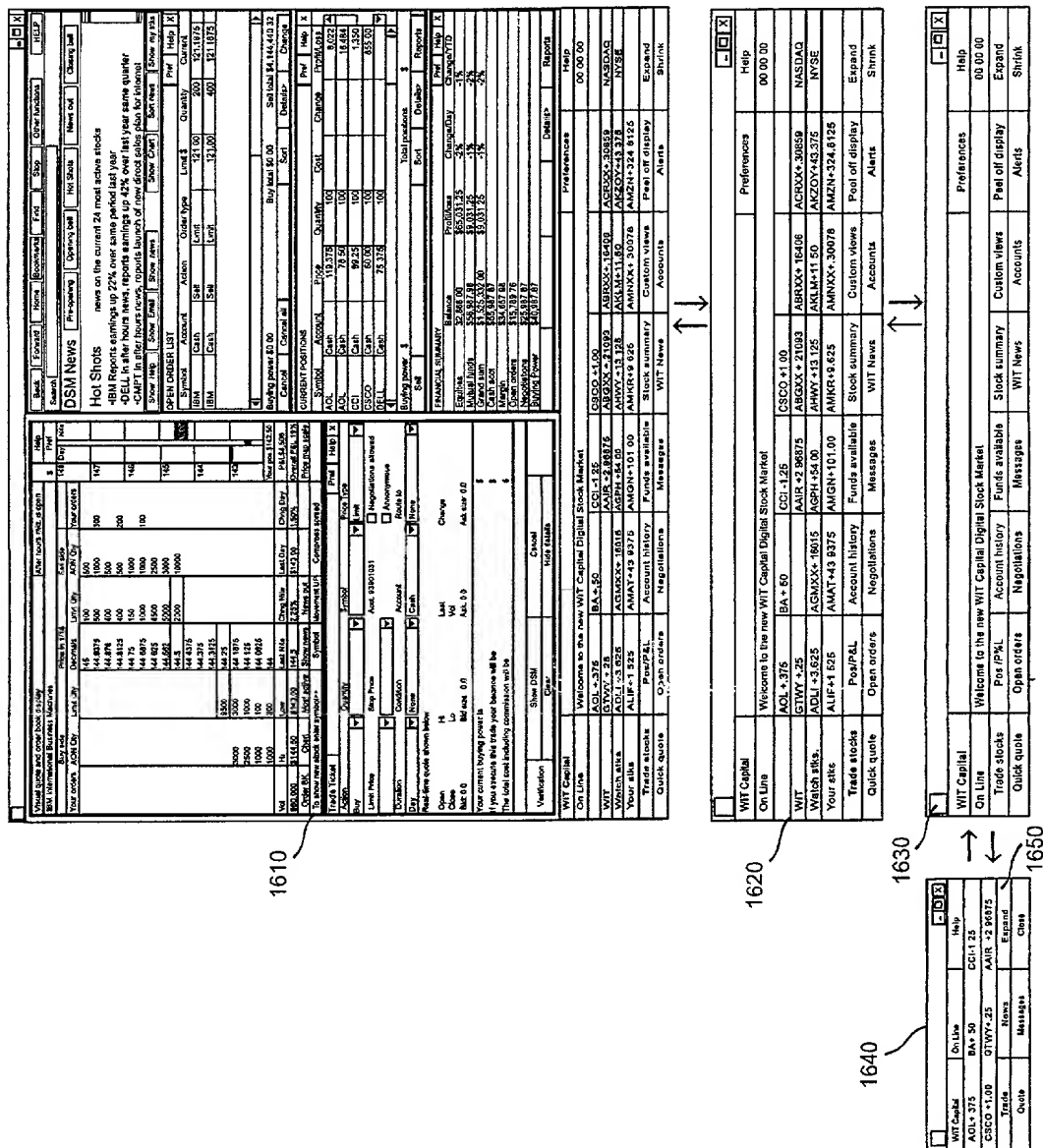


FIG. 15



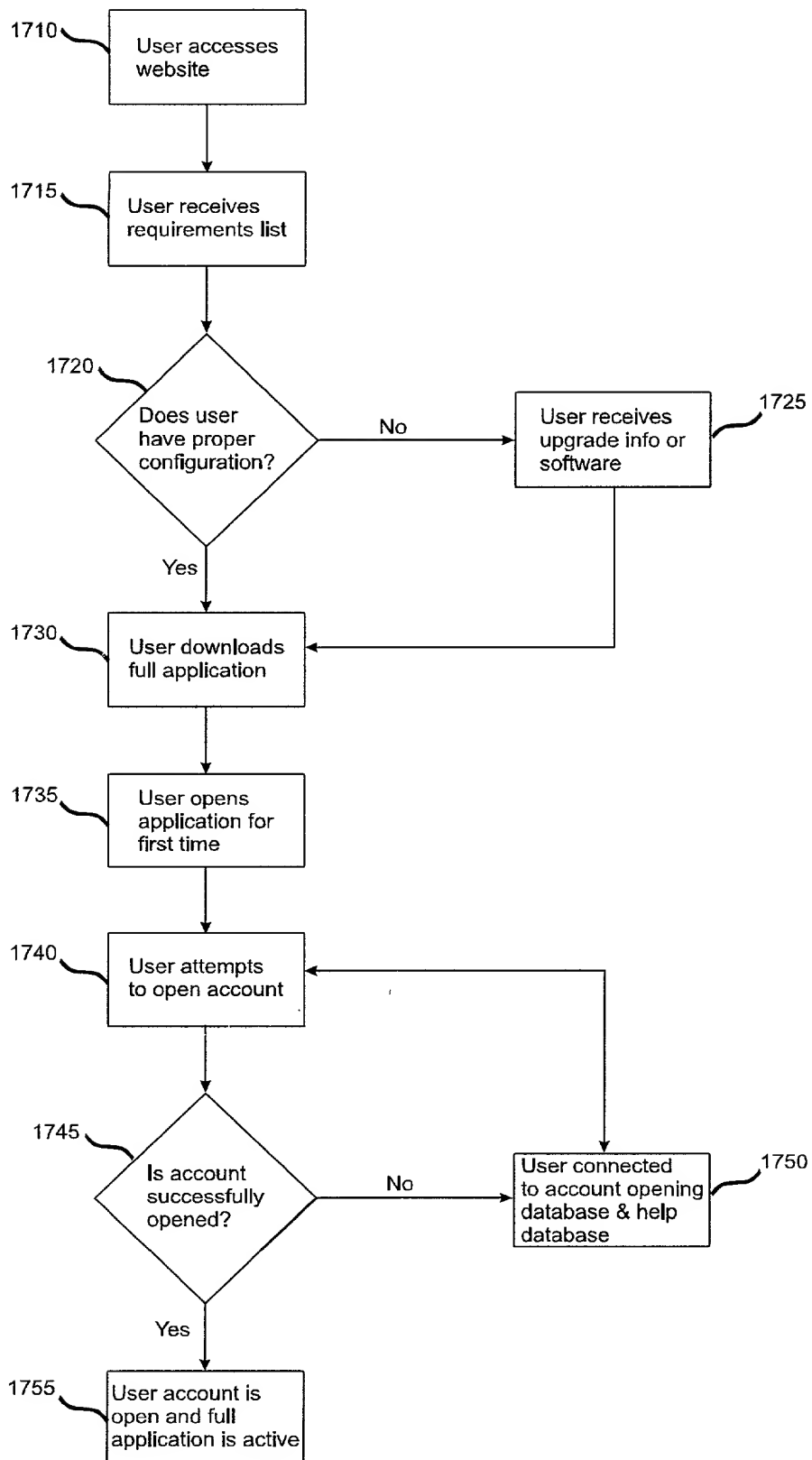


FIG. 17

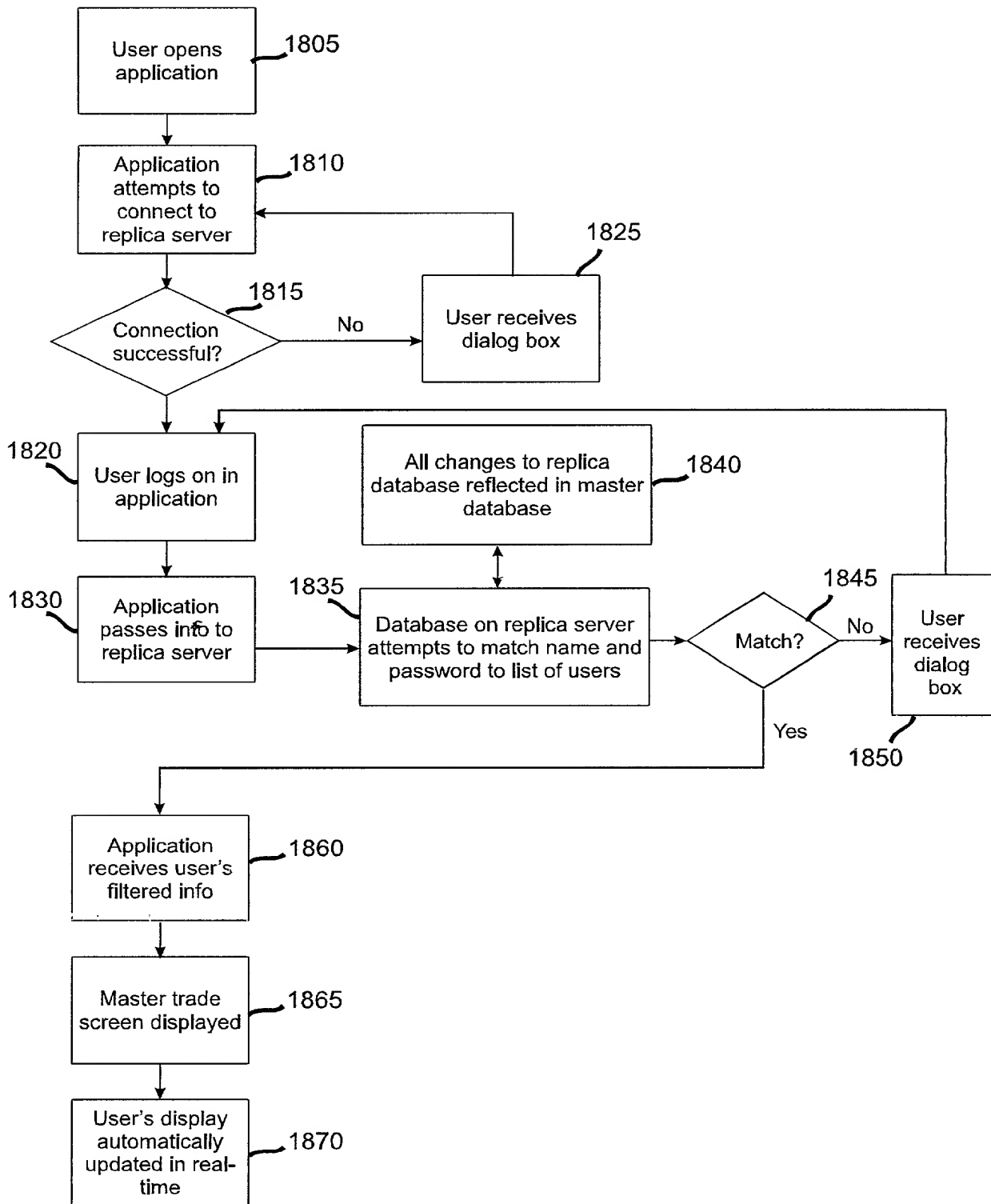


FIG. 18

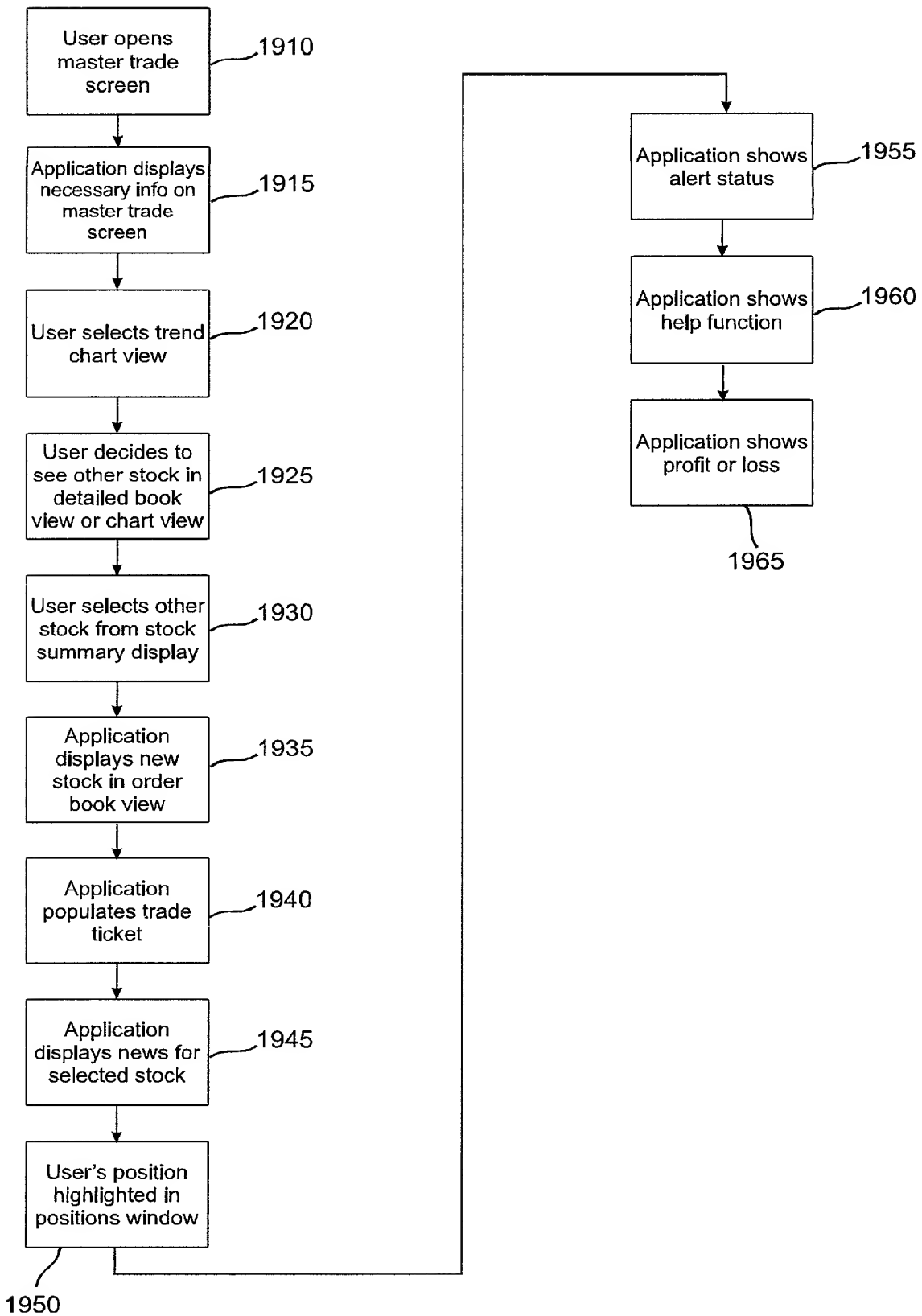


FIG. 19

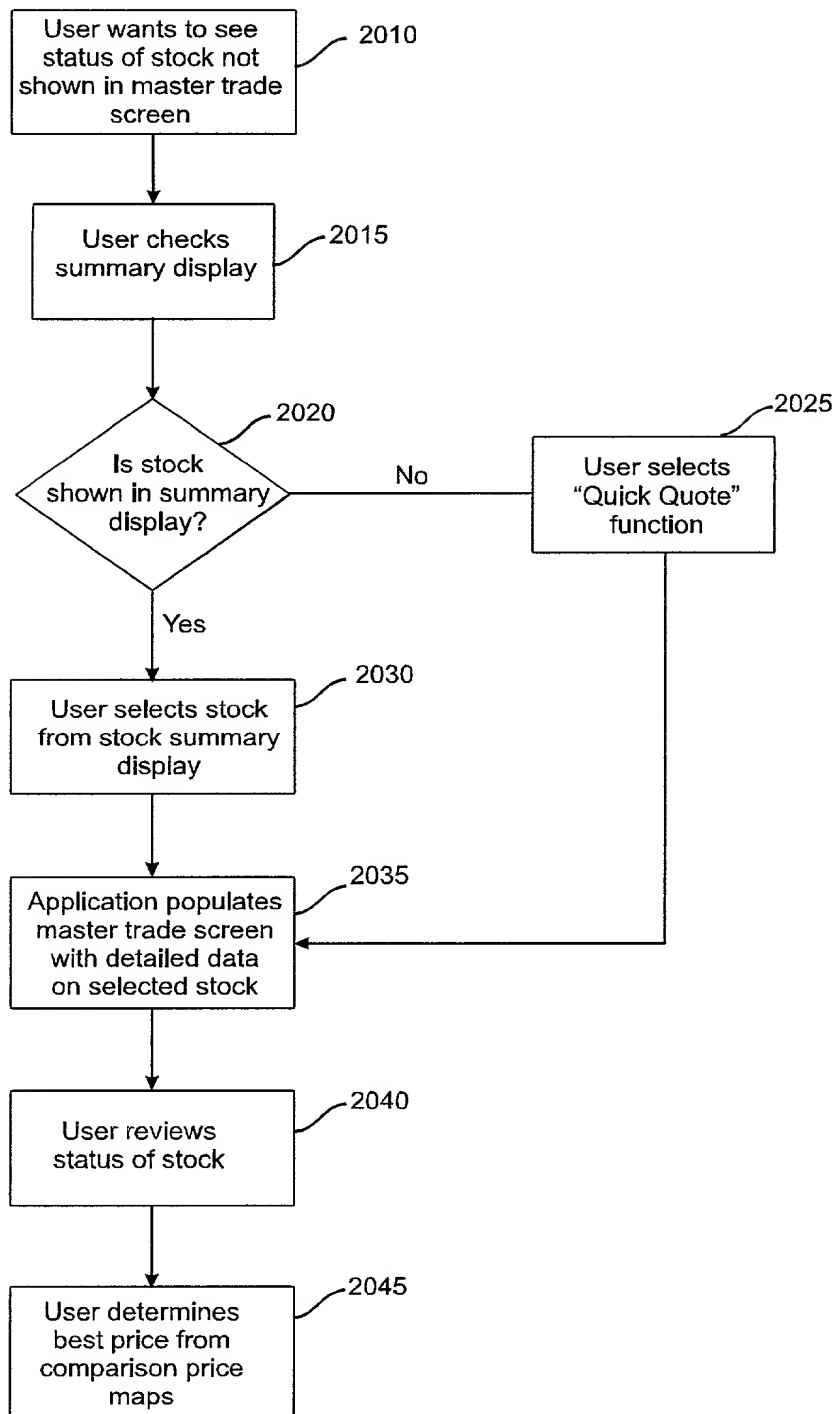


FIG. 20

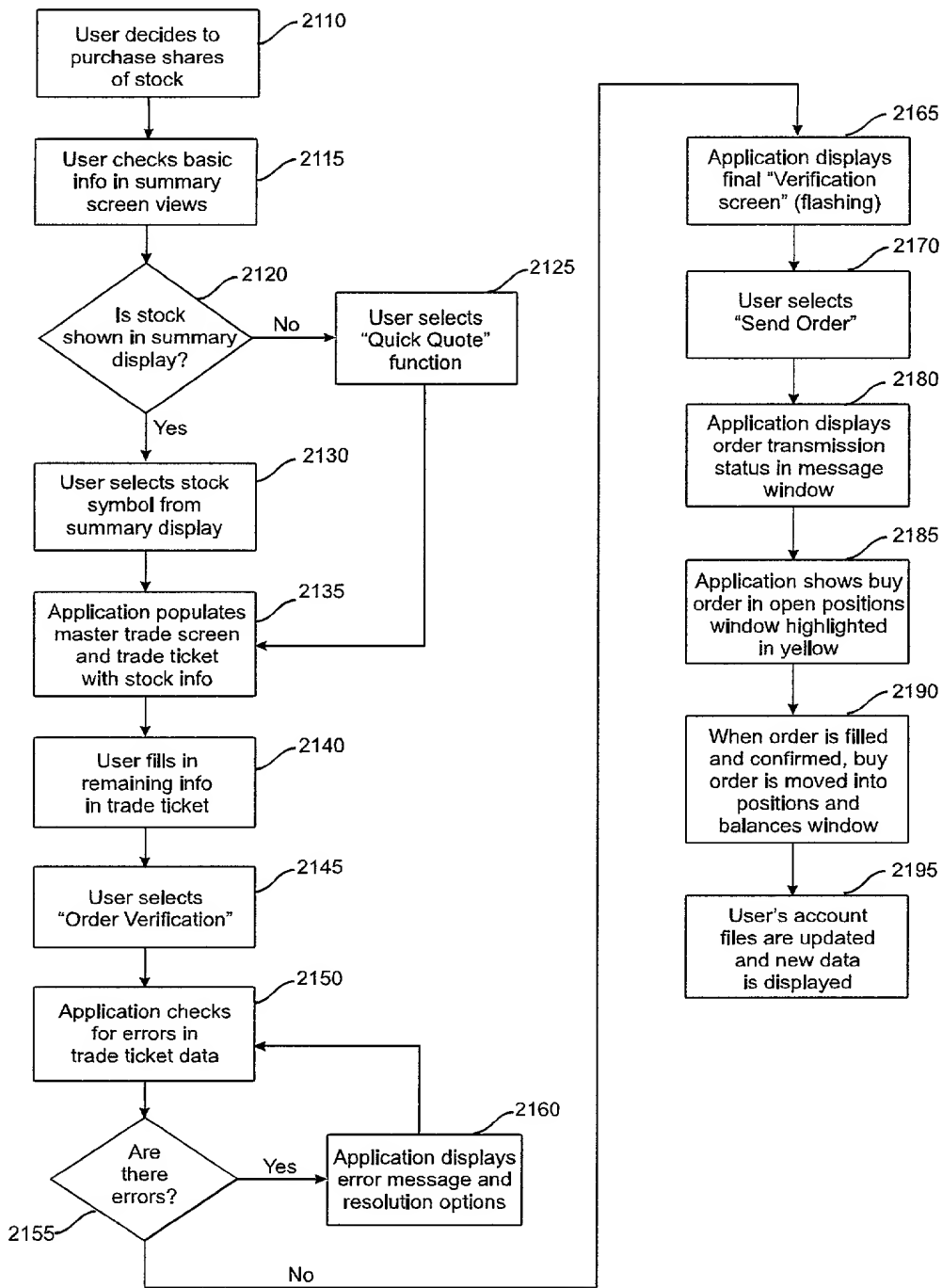


FIG. 21

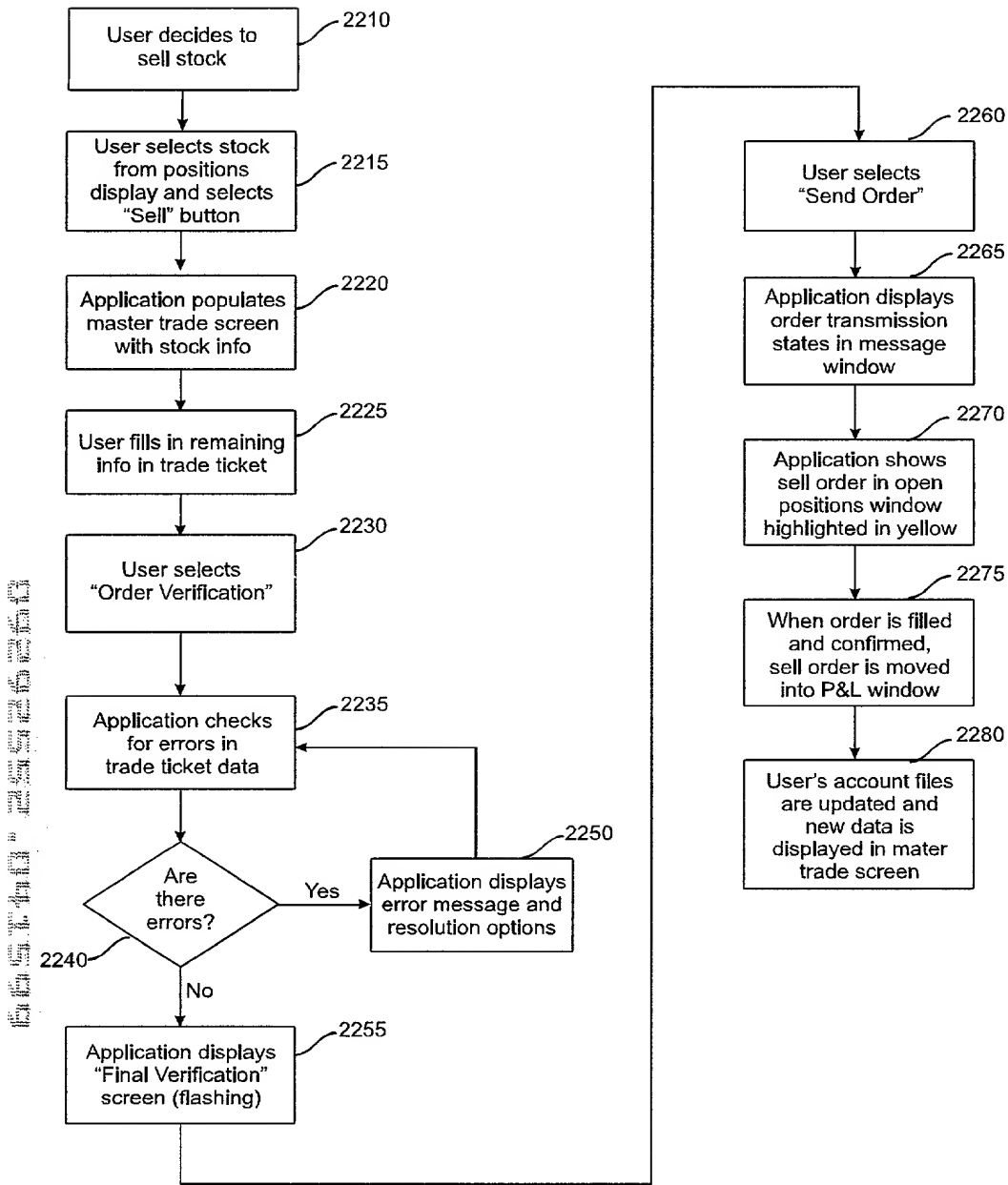


FIG. 22



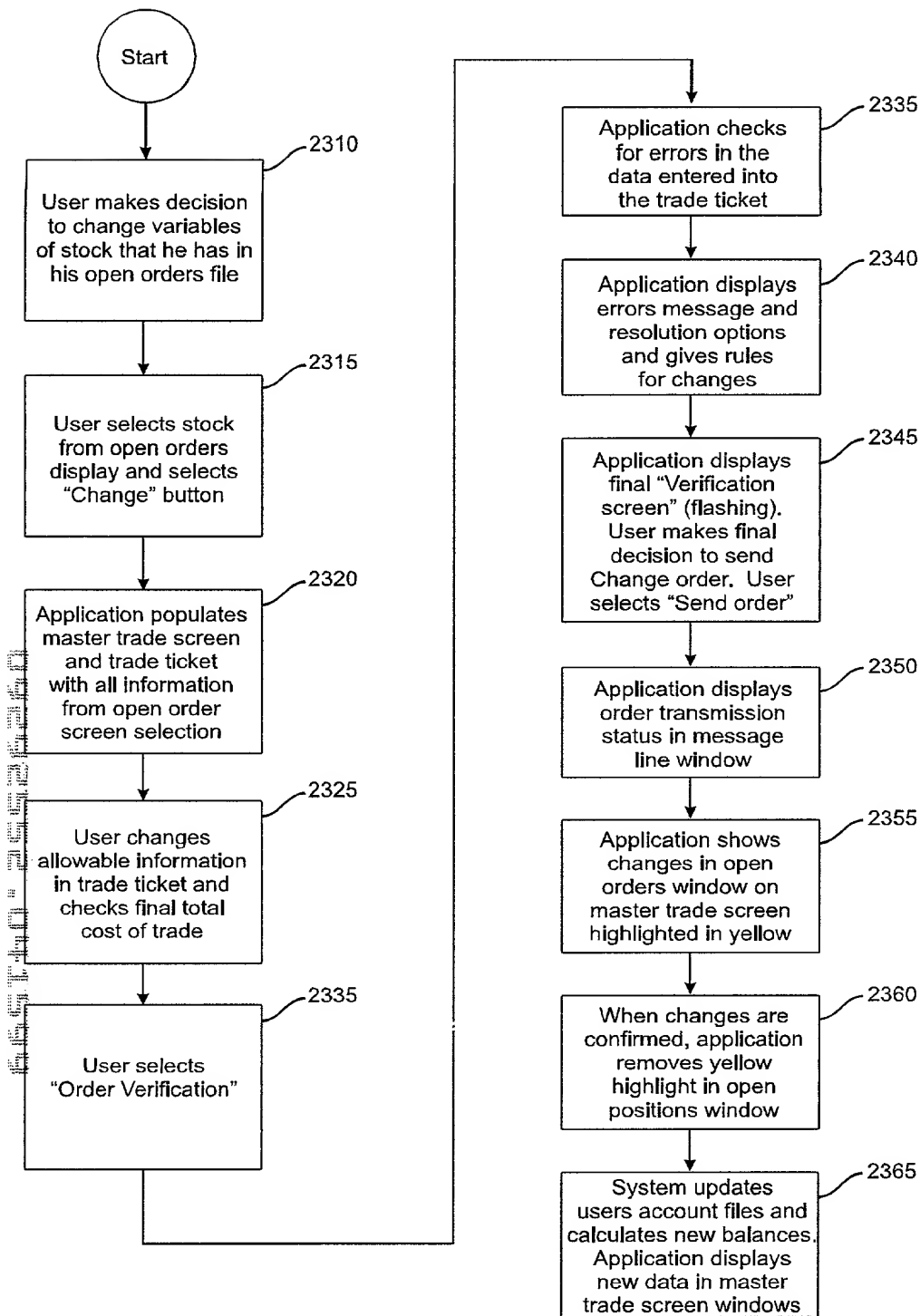


FIG. 23

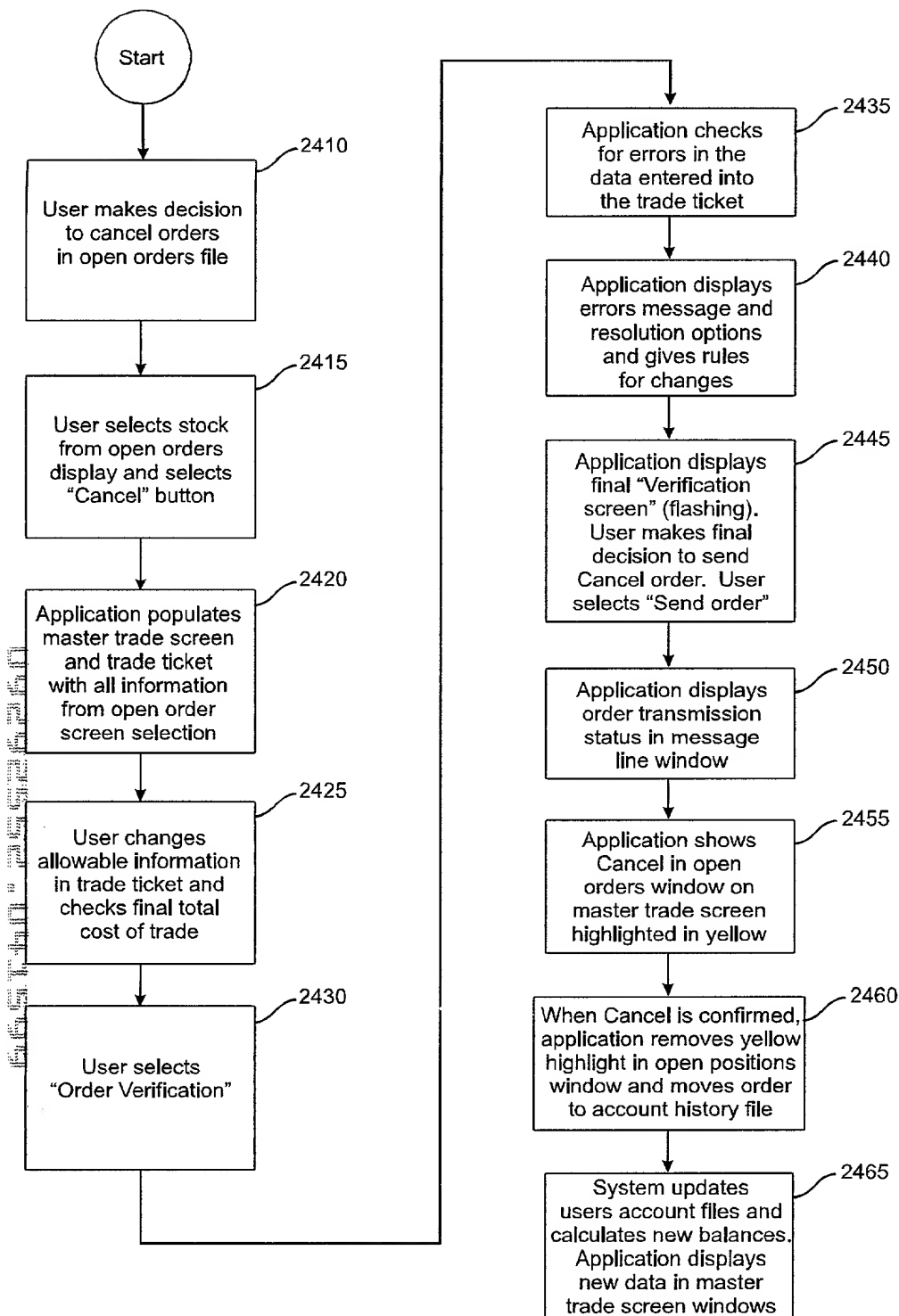


FIG. 24

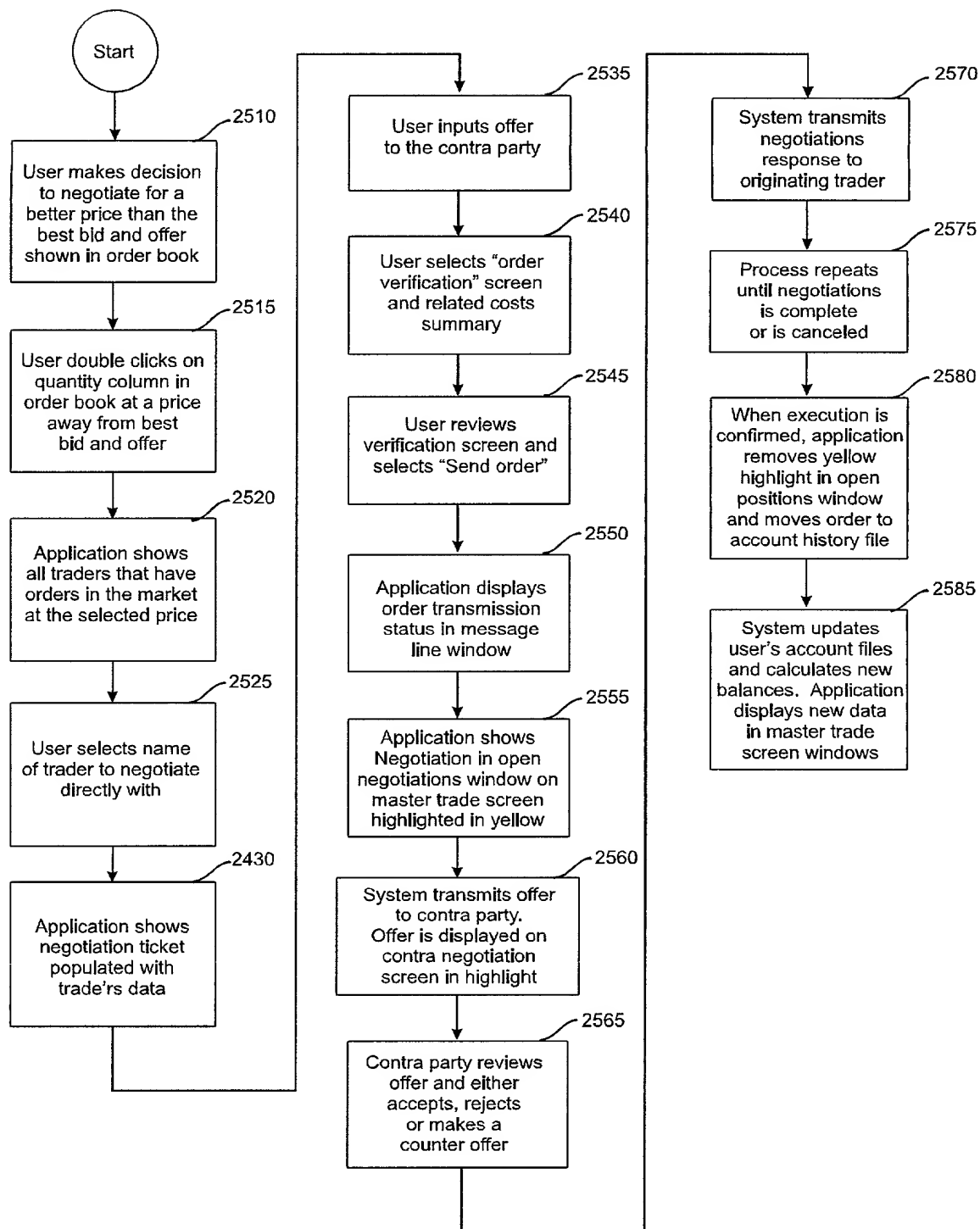


FIG. 25

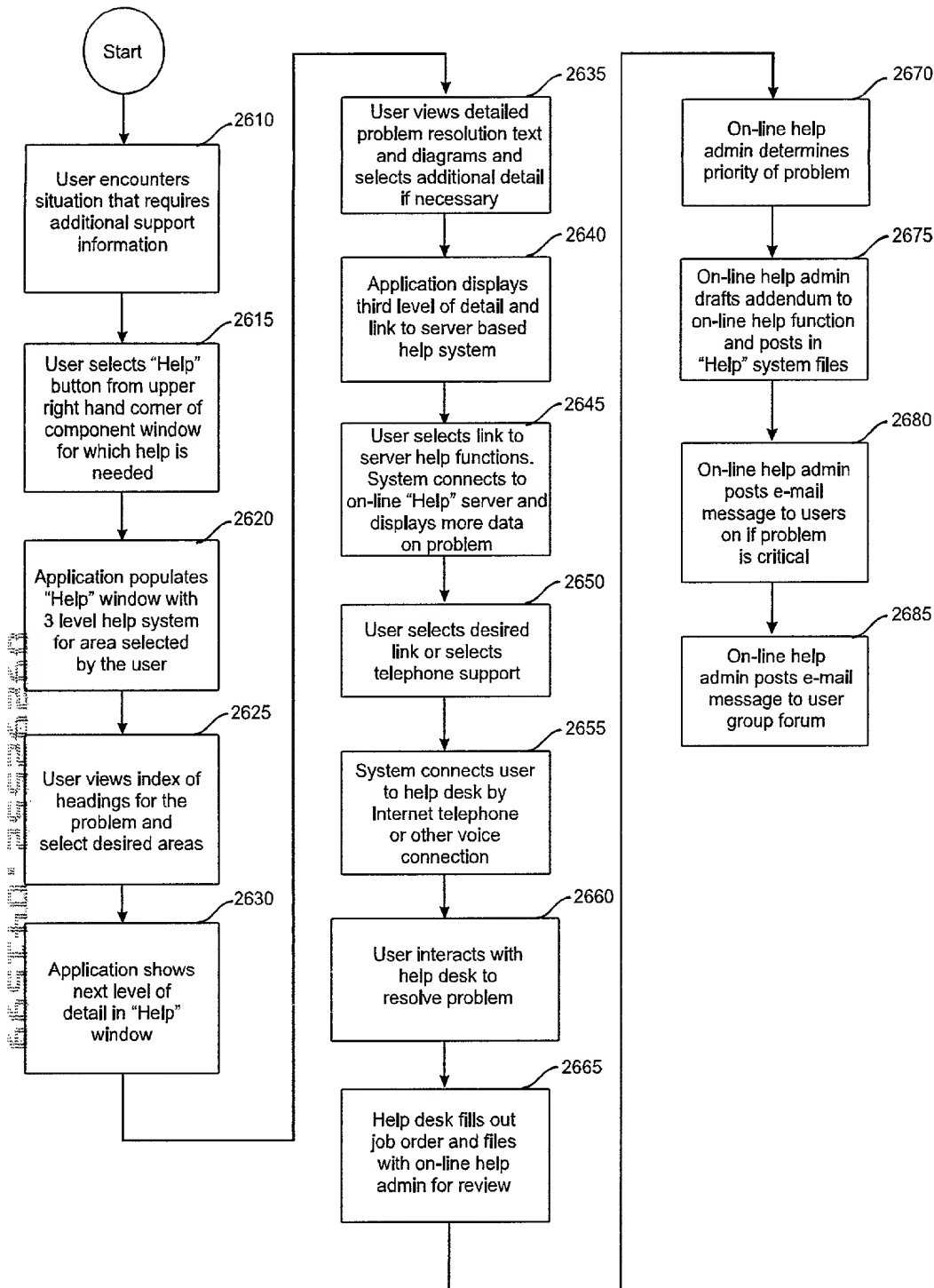


FIG. 26

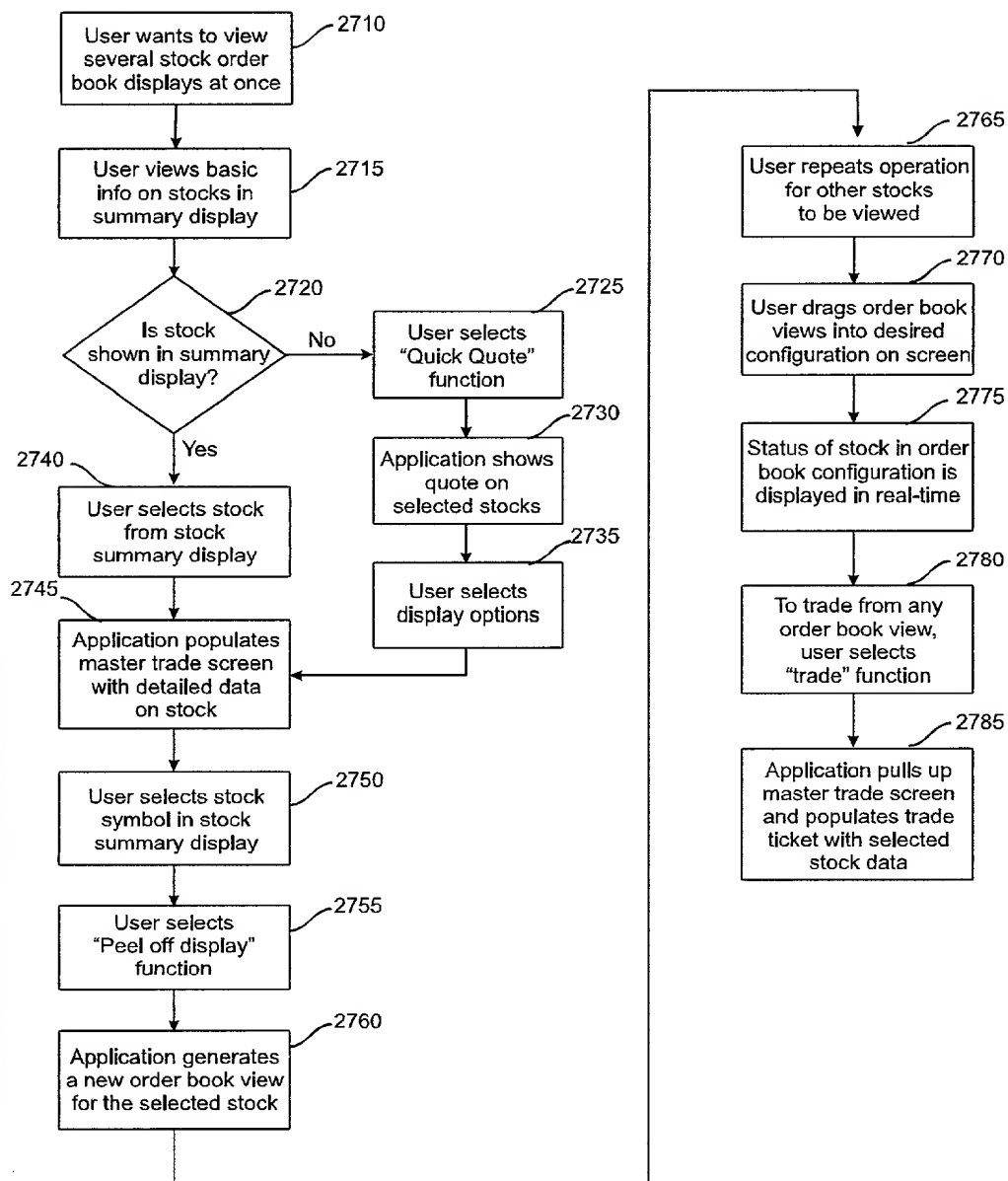


FIG. 27

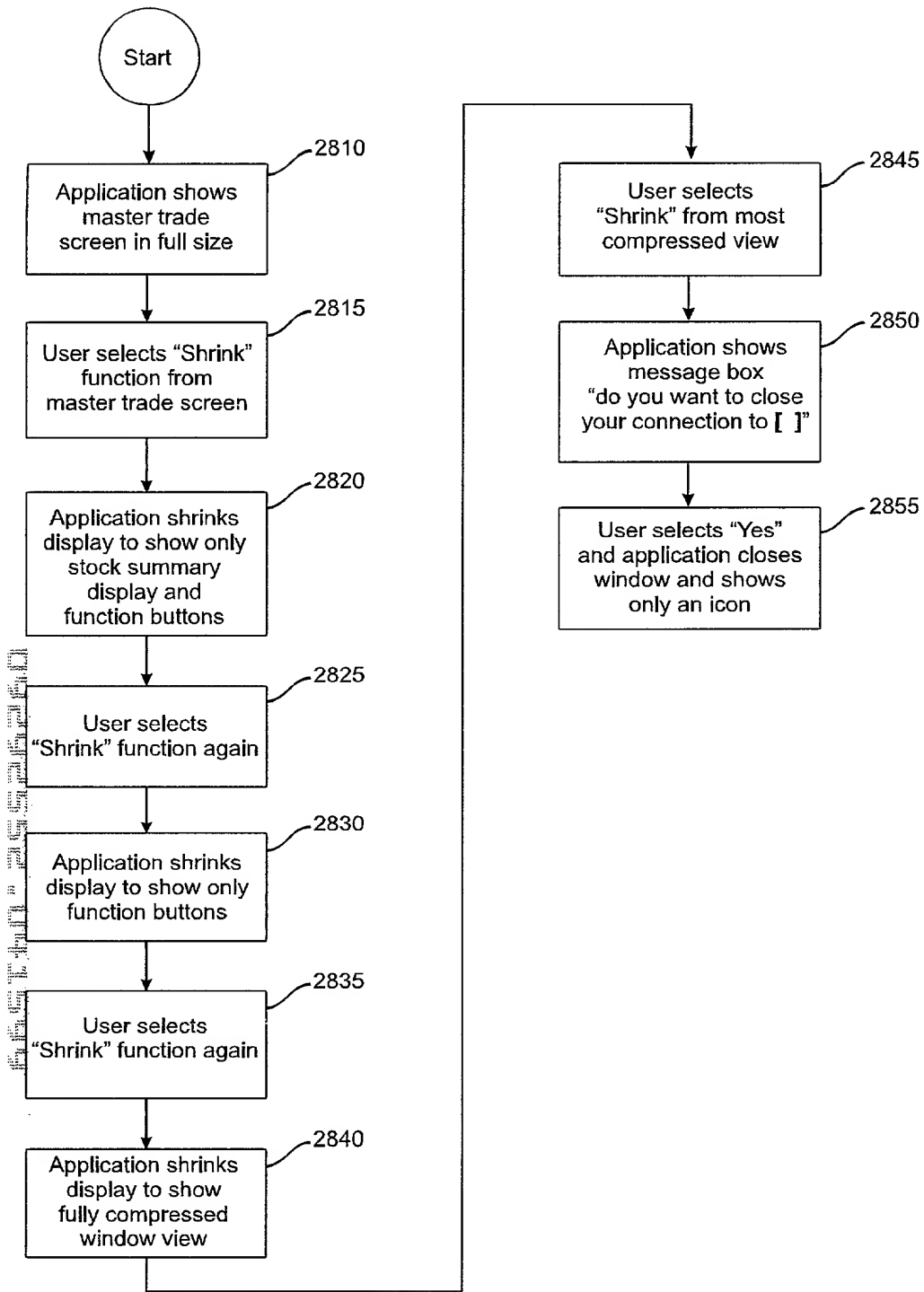


FIG. 28

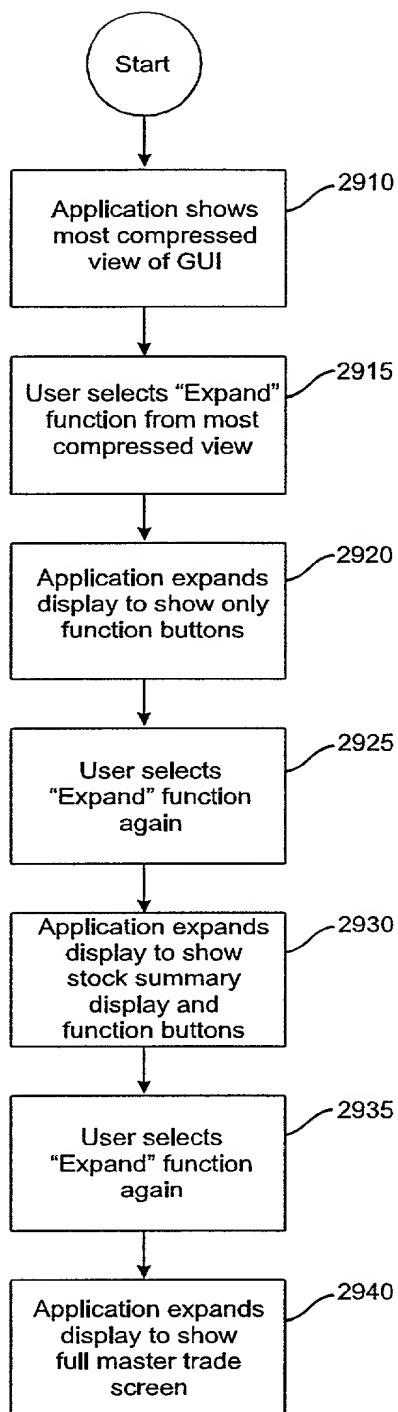


FIG. 29

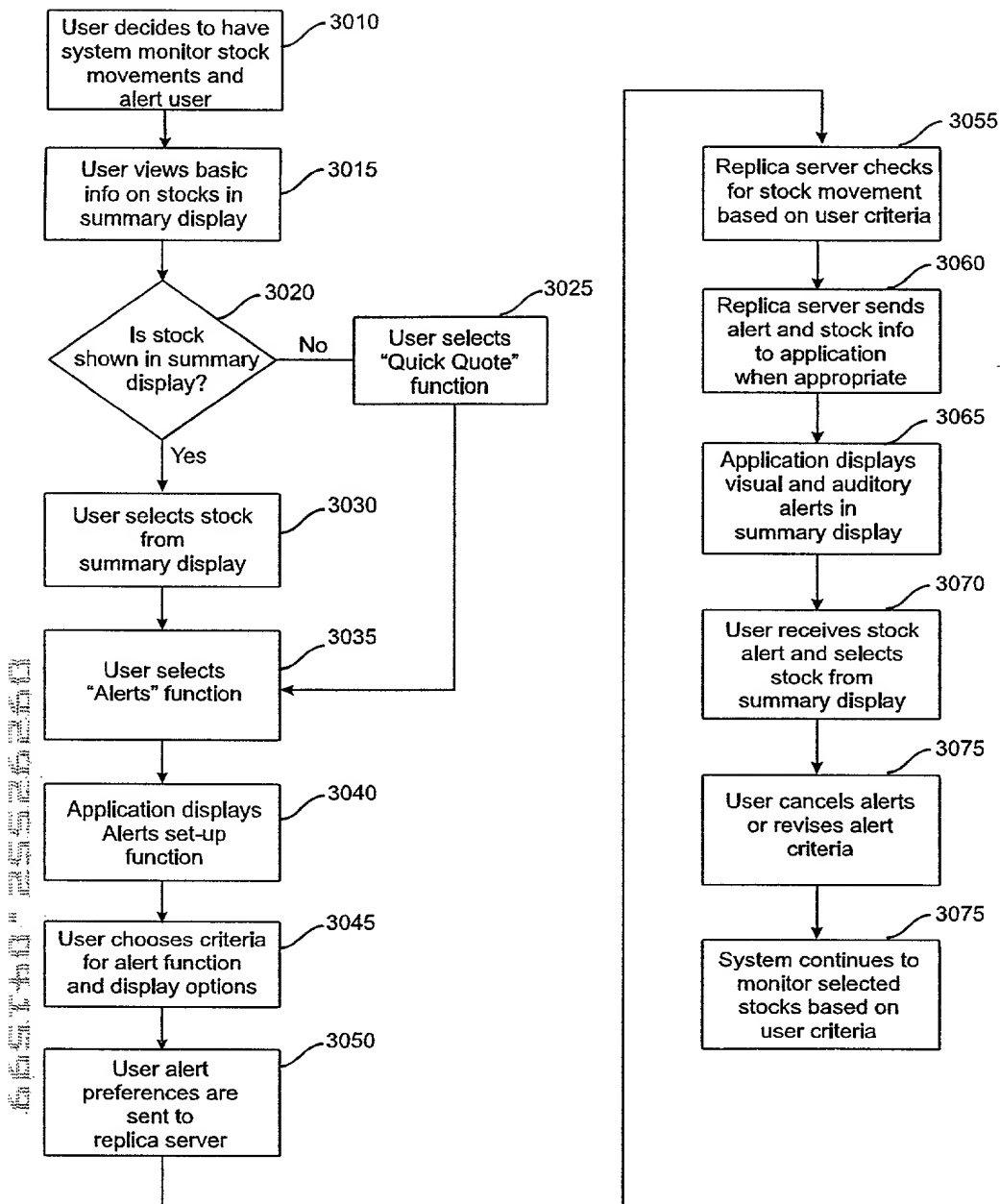


FIG. 30



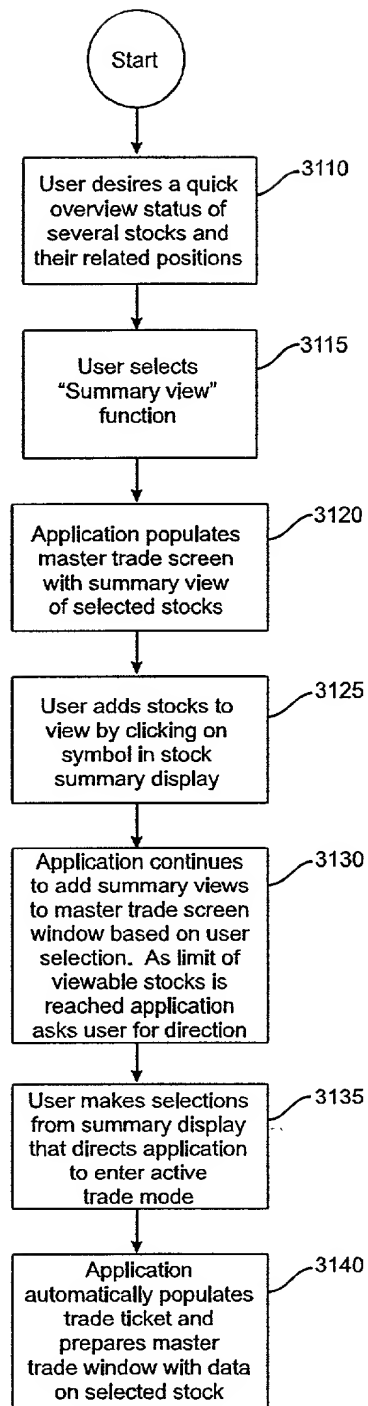


FIG. 31

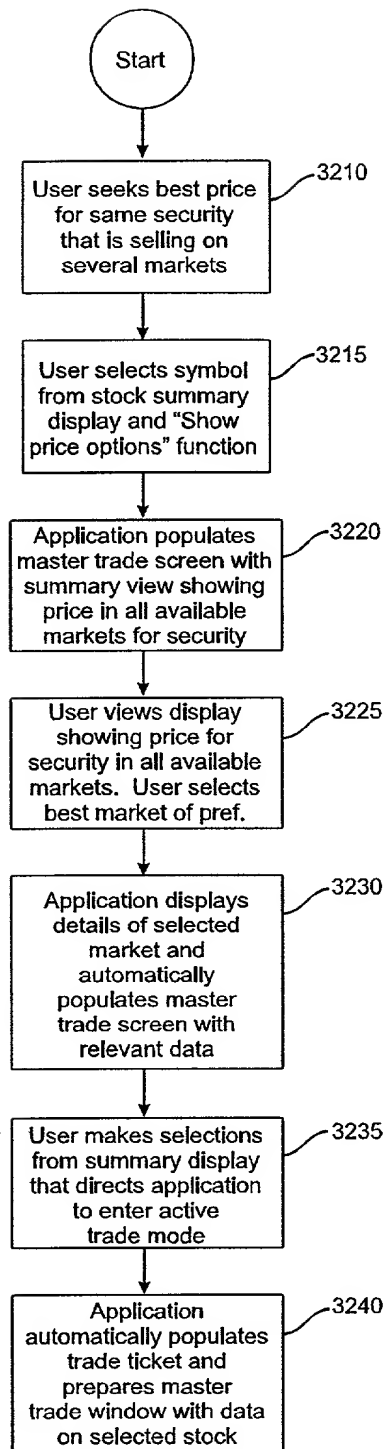


FIG. 32

FIG. 33

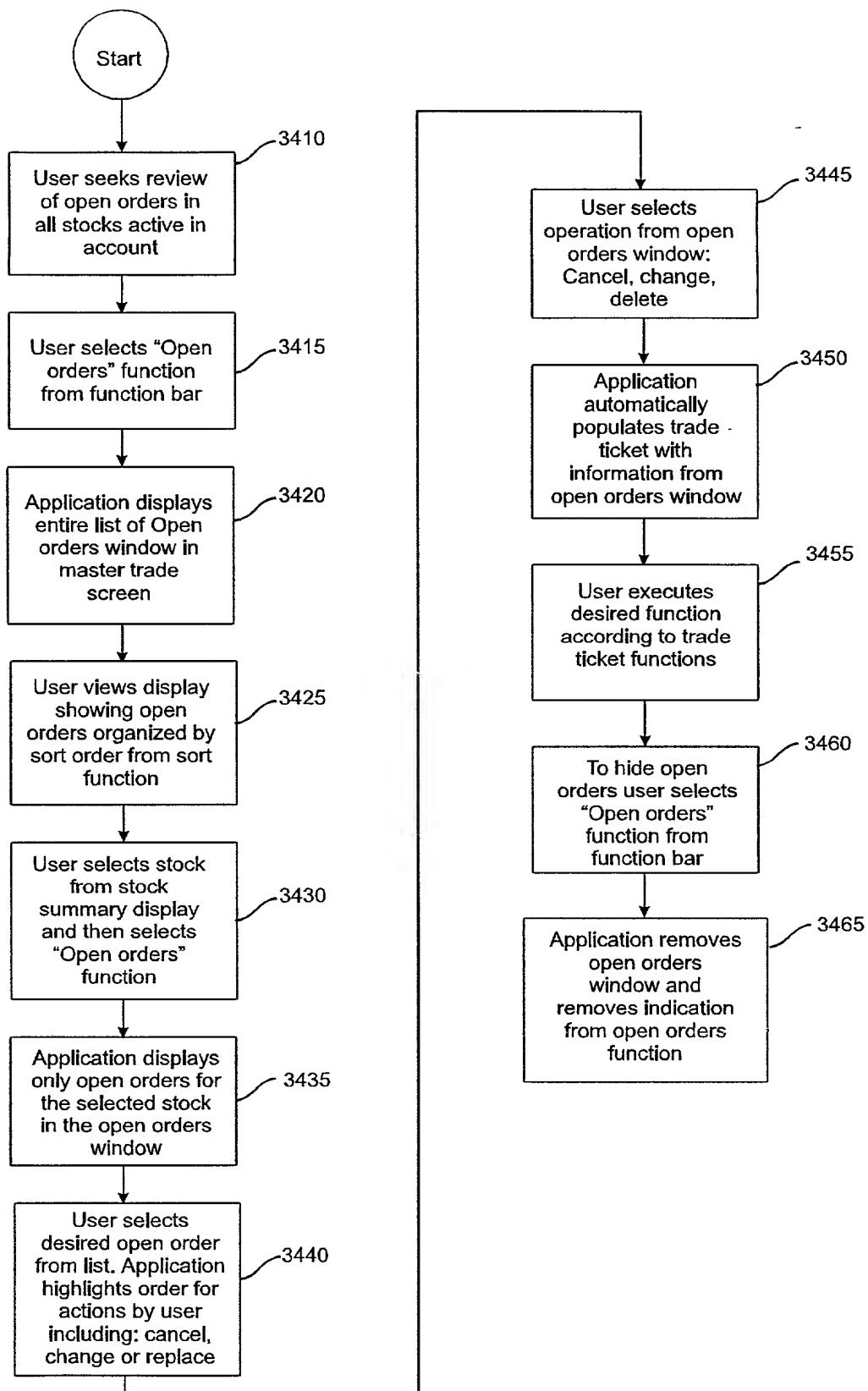


FIG. 34

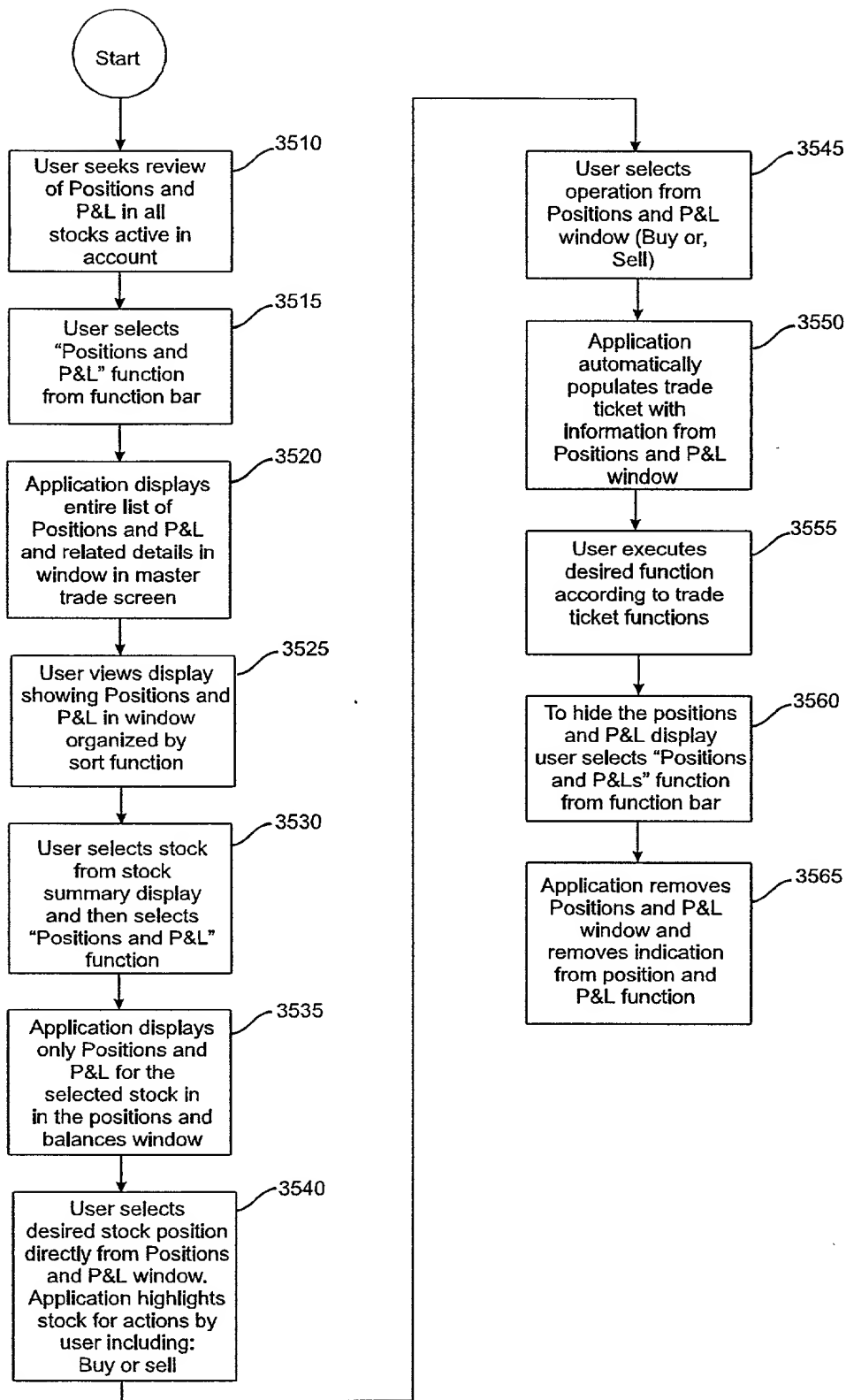


FIG. 35

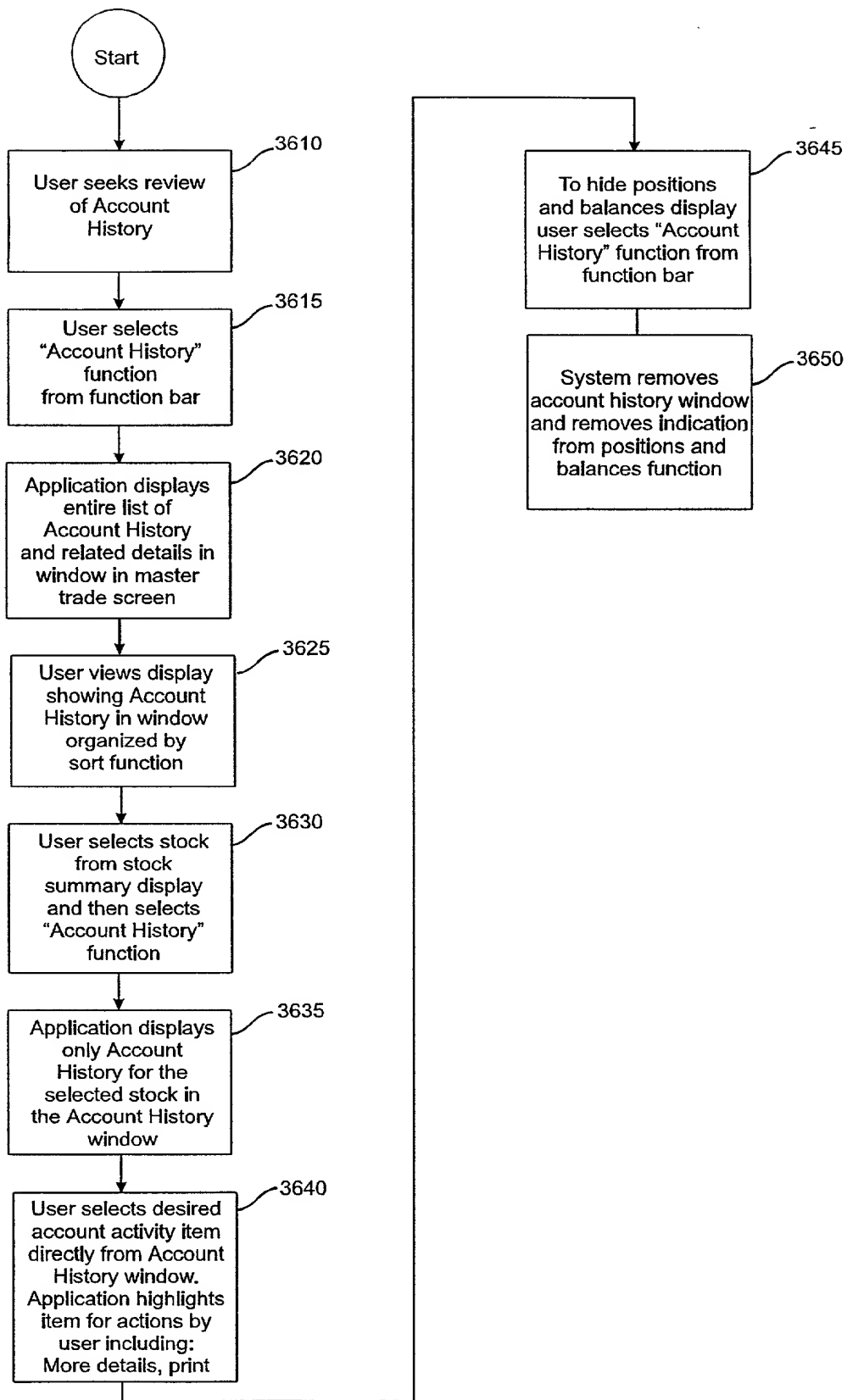


FIG. 36

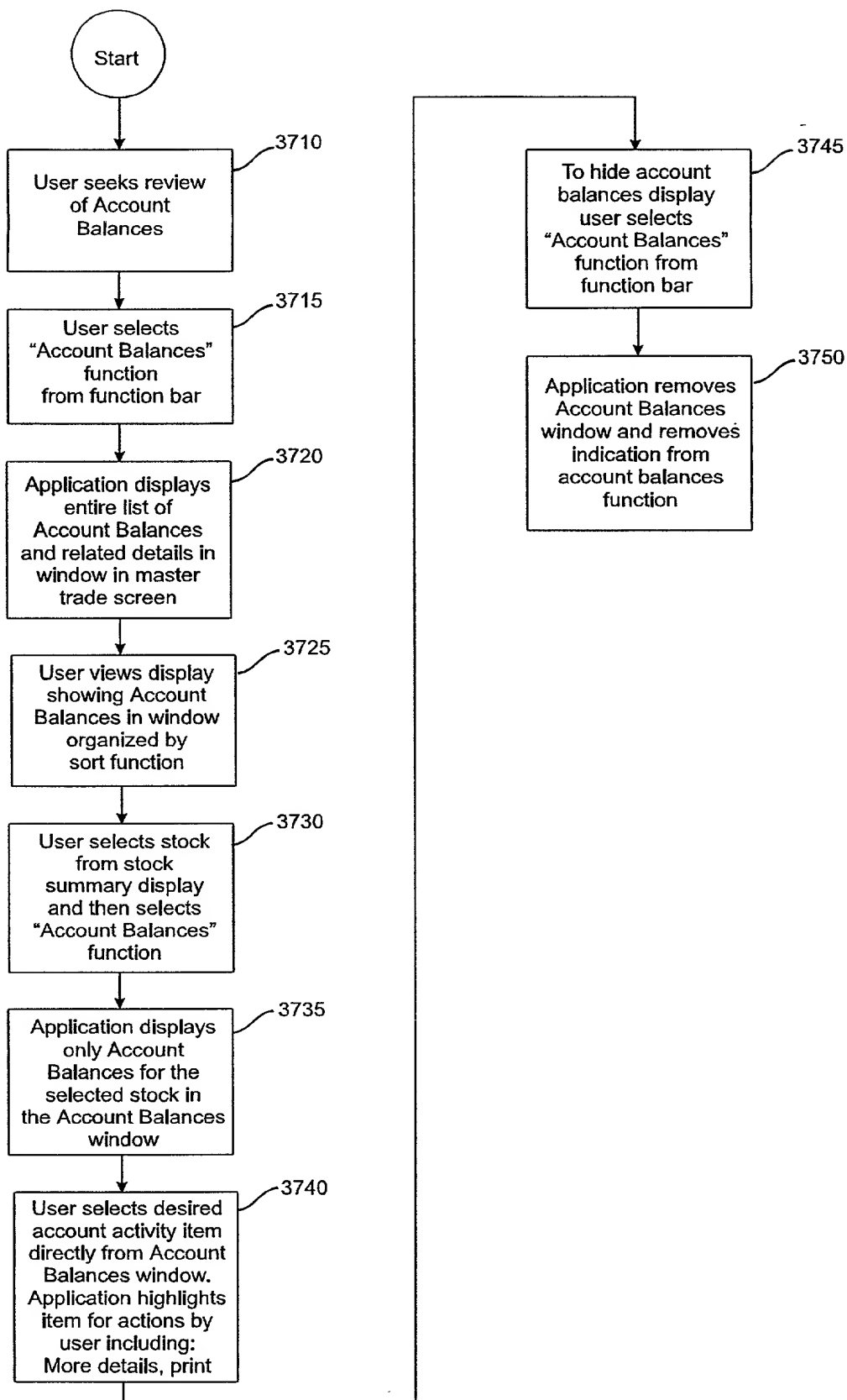
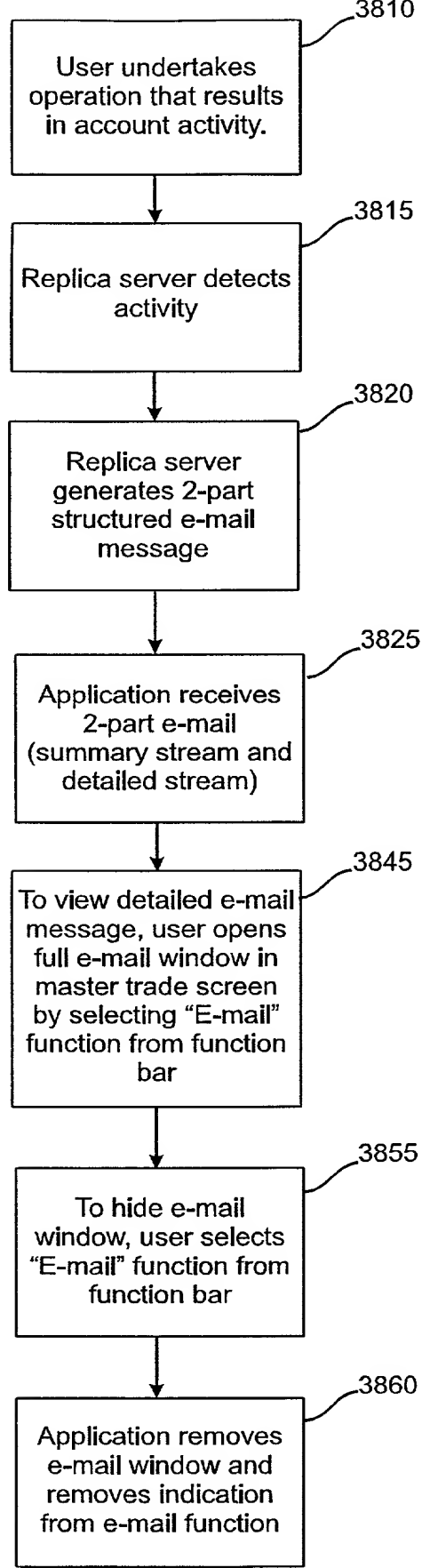


FIG. 37



Use of stock summary display symbol fields to call only e-mail on desired stocks

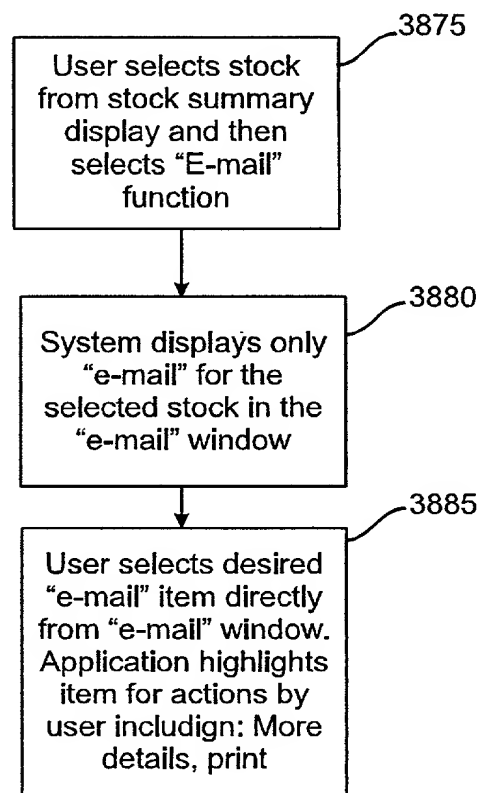


FIG. 38



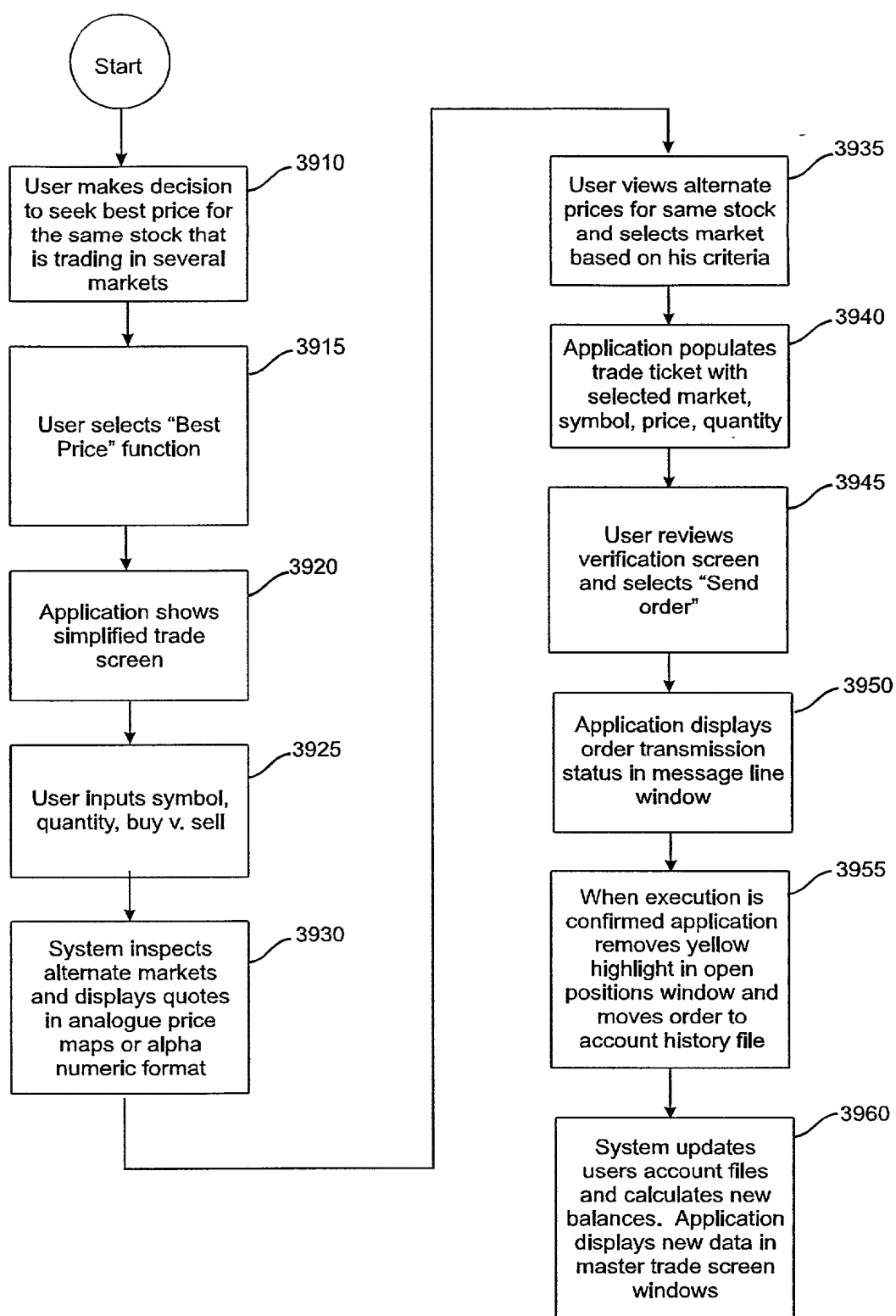


FIG. 39

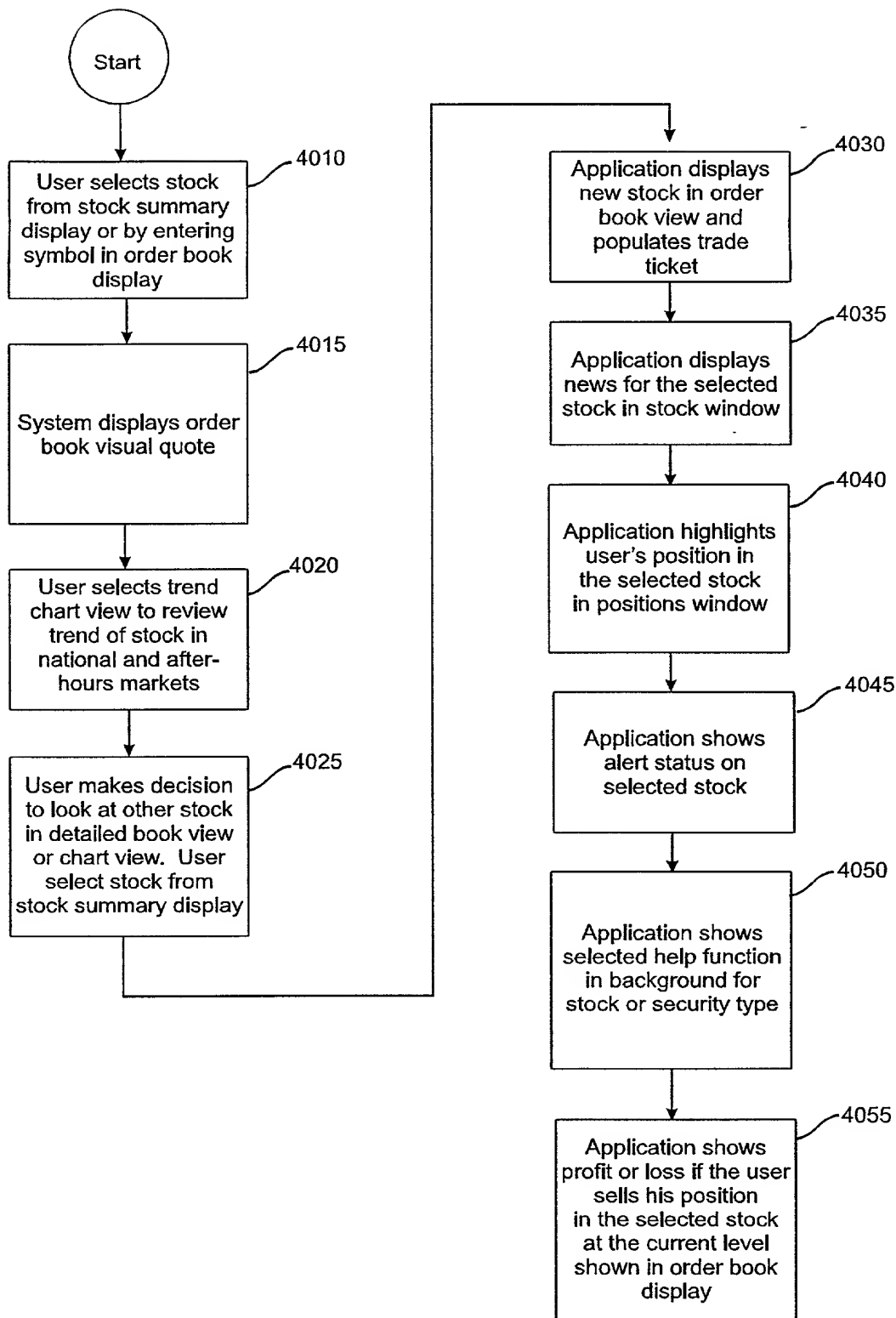


FIG. 40

## Negotiation Default Setup Screen

Enter the default values for limiting negotiations from other traders

Please note that the values you enter in the default settings will have a significant effect on the incoming orders you receive from other traders. The values you enter are defaults which can be overridden at any time by simply typing over the defaults in the negotiations screen.

1 What price above and below your limit price are you willing to negotiate?

Enter price increment here in 1/16 0.25

4105

2 What # of shares below and above your order size are you willing to negotiate?

Enter number of shares here 100

4110

3 What will be your default preferred negotiation time?

Enter desired increment here 10 min.

4115

4 What will be the lower time limit you will accept?

Enter minute increment here 2 min.

4120

Setting the defaults for each time you click the adjustment buttons

5 What will the increment be for each click of size change buttons?

Enter size increment here 100 shares

4125

6 What will the increment be for each click of time change buttons?

Enter size increment here 1 min.

4130

7 What will the increment be for each click of price change buttons?

Enter size increment here 0.0625

4135

8 On limit orders that you enter, do you want to have the system allow negotiations as your default settings? oYES or oNO

See on-line help (for details click here)

FIG. 41

4200
4265
4215
4270
4220
4225
4275
4230
4282

TRADERS AT A PRICE LEVEL						Sort	Pref.	Help
IBM: Sellers		Best offer	52.438	52.375	52.313	52.25	Set defaults	
Name	Price	Qty	Time	Activity	Total \$	P/L-BBO		
Fred D	52.5 (.187)	200 (20%)	6 min.(1)	0	\$10,500.00			
Dave K	52.5 (.25)	300 (10%)	4 min.(2)	2	\$15,750.00			
Larry 22	52.5 (.5)	1000(50%)	3 min.(1)	4	\$52,500.00			
Betty Y	52.5 (.25)	300 (5%)	8 min.(4)	2	\$15,750.00			
Bill B	52.5 (.062)	200 (30%)	10 min.(3)	1	\$10,500.00			
Terry H	52.5 (.25)	100 (5%)	20 min.(4)	0	\$5,250.00			
Billy T	52.5 (.187)	200 (40%)	6 min.(3)	4	\$10,500.00			

4255
4280
4285
4205

OUT-GOING NEGOTIATIONS					
Larry 22	Sell order	52.1/2 (.5)	1000 (50%)	3 min. (1)	4-IBM \$52,500.00
RON-3	Counter 1				

4210

IN-COMING NEGOTIATIONS							

Cancel

Broadcast

Price UP

Qty Up

Time Up

Accept

Reject

Send

Price Down

Qty Down

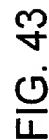
Time Down

4212
4216
4222
4240
4232
4245
4250
4242
4252
4262

FIND		Action ▼	Stock	Trader	Trader list ▼	Add	Delete

4214

FIG. 42



**FIG. 43**

TRADERS AT A PRICE LEVEL							Sort	Pref.	Help
IBM: Sellers	Best offer	52.438	52.375	52.313	52.25	Set defaults			
Name	Price	Qty	Time	Activity	Total \$	P/L-BBO			
Fred D	52.5 (.187)	200 (20%)	6 min.(1)	0	\$10,500.00				
Dave K	52.5 (.25)	300 (10%)	4 min.(2)	2	\$15,750.00				
Larry 22	52.5 (.5)	1000(50%)	3 min.(1)	4	\$52,500.00				
Betty Y	52.5 (.25)	300 (5%)	8 min.(4)	2	\$15,750.00				
Bill B	52.5 (.062)	200 (30%)	10 min.(3)	1	\$10,500.00				
Terry H	52.5 (.25)	100 (5%)	20 min.(4)	0	\$5,250.00				
Billy T	52.5 (.187)	200 (40)%	6 min.(3)	4	\$10,500 .00				
OUT-GOING NEGOTIATIONS									
Larry 22	Sell order	52.1/2 (.5)	1000 (50%)	3 min. (1)	4-IBM	\$52,500.00			
RON-3	Counter 1	52.1/2 (.5)	1000 (50%)	3 min. (1)		\$52,500.00			
IN-COMING NEGOTIATIONS									
Cancel	Broadcast	Price UP	Qty Up	Time Up	Accept	Reject	Send		
		Price Down	Qty Down	Time Down					
FIND (Action▼) Stock							Trader	Trader list▼	Add Delete

FIG. 44

TRADERS AT A PRICE LEVEL				Sort	Pref.	Help
IBM: Sellers	Best offer	52.438	52.375	52.313	52.25	Set defaults
Name	Price	Qty	Time	Activity	Total \$	P/L-BBO
Fred D	52.5 (.187)	200 (20%)	6 min.(1)	0	\$10,500.00	<input type="checkbox"/>
Dave K	52.5 (.25)	300 (10%)	4 min.(2)	2	\$15,750.00	
Larry 22	52.5 (.5)	1000(50%)	3 min.(1)	4	\$52,500.00	
Betty Y	52.5 (.25)	300 (5%)	8 min.(4)	2	\$15,750.00	
Bill B	52.5 (.062)	200 (30%)	10 min.(3)	1	\$10,500.00	
Terry H	52.5 (.25)	100 (5%)	20 min.(4)	0	\$5,250.00	
Billy T	52.5 (.187)	200 (40%)	6 min.(3)	4	\$10,500.00	
OUT-GOING NEGOTIATIONS						
Larry 22	Sell order	52.1/2 (.5)	1000 (50%)	3 min. (1)	4-IBM	\$52,500.00
RON-3	Counter 1	52	500	2 min.		\$26,000.00 93.50
IN-COMING NEGOTIATIONS						
Cancel	Broadcast	Price UP	Qty Up	Time Up	Accept	Reject
		Price Down	Qty Down	Time Down		Send
FIND Action ▼ Stock <input type="text"/> Trader <input type="text"/> Trader list ▼ Add <input type="button"/> Delete <input type="button"/>						

45 0

4520

FIG. 45

TRADERS AT A PRICE LEVEL					Sort	Pref.	Help
IBM: Sellers		Best offer	52.438	52.375	52.313	52.25	Set defaults
Name	Price	Qty	Time	Activity	Total \$	P/L-BBO	
Fred D	52.5 (.187)	200 (20%)	6 min.(1)	0	\$10,500.00	-	
Dave K	52.5 (.25)	300 (10%)	4 min.(2)	2	\$15,750.00		
Larry 22	52.5 (.5)	1000(50%)	3 min.(1)	4	\$52,500.00		
Betty Y	52.5 (.25)	300 (5%)	8 min.(4)	2	\$15,750.00		
Bill B	52.5 (.062)	200 (30%)	10 min.(3)	1	\$10,500.00		
Terry H	52.5 (.25)	100 (5%)	20 min.(4)	0	\$5,250.00		
Billy T	52.5 (.187)	200 (40%)	6 min.(3)	4	\$10,500.00		

OUT-GOING NEGOTIATIONS						
Larry 22	Sell order	52.1/2 (.5)	1000 (50%)	3 min. (1)	4-IBM	\$52,500.00
RON-3	Counter 1	52	500	2 min.	2	\$26,000.00 \$93.50
Larry 22	Counter 2	52.25	800	1 min.	4	\$41,800.00

IN-COMING NEGOTIATIONS						
Cancel	Broadcast	Price UP	Qty Up	Time Up	Accept	Reject
		Price Down	Qty Down	Time Down		Send

FIND (Action ▼) Stock	Trader	Trader list ▼	Add	Delete
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4610

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4625

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FIG. 46



TRADERS AT A PRICE LEVEL					Sort	Pref.	Help
IBM: Sellers					52.313	52.25	Set defaults
Name	Price	Qty	Time	Activity	Total \$	P/L-BBO	
Fred D	52.5 (.187)	200 (20%)	6 min.(1)	0	\$10,500.00		<input type="checkbox"/>
Dave K	52.5 (.25)	300 (10%)	4 min.(2)	2	\$15,750.00		
Larry 22	52.5 (.5)	1000(50%)	3 min.(1)	4	\$52,500.00		
Betty Y	52.5 (.25)	300 (5%)	8 min.(4)	2	\$15,750.00		
Bill B	52.5 (.062)	200 (30%)	10 min.(3)	1	\$10,500.00		
Terry H	52.5 (.25)	100 (5%)	20 min.(4)	0	\$5,250.00		
Billy T	52.5 (.187)	200 (40%)	6 min.(3)	4	\$10,500.00		

Larry 22	Sell order	52.1/2 (.5)	1000 (50%)	3 min. (1)	4-IBM	\$52,500.00	
RON-3	Counter 1	52	500	2 min.	2	\$26,000.00	\$3.50
Larry 22	Counter 2	52.25	800	1 min.	4	\$41,800.00	

IN-COMING NEGOTIATIONS							
RON-3	Buy order	152.1/2 (.5)	2000 (50%)	10 min. (2)	2-T	\$305,000.00 (1,567)	
Fred 4U	Counter 1	152	1000	2 min.	3	\$152,000.00	
	Counter 2						

Cancel	Broadcast	Price UP	Qty Up	Time Up	Accept	Reject	Send
		Price Down	Qty Down	Time Down			

FIND (Action▼) Stock	Trader	Trader list▼	Add	Delete
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FIG. 47

4810

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4830

4840

TRADERS AT A PRICE LEVEL					Sort	Pref.	Help
IBM: Sellers		Best offer	52.438	52.375	52.313	52.25	Set defaults
Name	Price	Qty	Time	Activity	Total \$	P/L-BBO	
Fred D	52.5 (.187)	200 (20%)	6 min.(1)	0	\$10,500.00		
Dave K	52.5 (.25)	300 (10%)	4 min.(2)	2	\$15,750.00		
Larry 22	52.5 (.5)	1000(50%)	3 min.(1)	4	\$52,500.00		
Betty Y	52.5 (.25)	300 (5%)	8 min.(4)	2	\$15,750.00		
Bill B	52.5 (.062)	200 (30%)	10 min.(3)	1	\$10,500.00		
Terry H	52.5 (.25)	100 (5%)	20 min.(4)	0	\$5,250.00		
Billy T	52.5 (.187)	200 (40%)	6 min.(3)	4	\$10,876.00		

OUT-GOING NEGOTIATIONS							
Larry 22	Sell order	52.1/2 (.5)	1000 (50%)	3 min. (1)	4-IBM	\$52,500.00	
RON-3	Counter 1	52	500	2 min.	2	\$26,000.00	93.50
Larry 22	Counter 2	52.25	800	1 min.	4	\$41,800.00	
Frank5	Sell order	89.1/4 (.25)	500 (25%)	5 min. (2)	0-DELL	\$44,625.00	
RON-3	Counter 1	89	400	3 min.	2	\$35,600.00	435.98
	Counter 2						

IN-COMING NEGOTIATIONS							
RON-3	Buy order	152.1/2 (.5)	2000 (50%)	10 min. (2)	2-T	\$305,000.00	(1,567)
Fred 4U	Counter 1	152	1000	2 min.	3	\$152,000.00	
	Counter 2						
RON-3	Buy order	189.1/4 (.25)	500 (25%)	5 min. (2)	1-YHOO	\$94,625.00	(125.00)
David44	Counter 1	189	500	1 min.	1	\$94,500.00	
	Counter 2						

Cancel	Broadcast	Price UP	Qty Up	Time Up	Accept	Reject	Send
		Price Down	Qty Down	Time Down			

FIND (Action▼) Stock		Trader		Trader list▼	Add	Delete
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FIG. 48

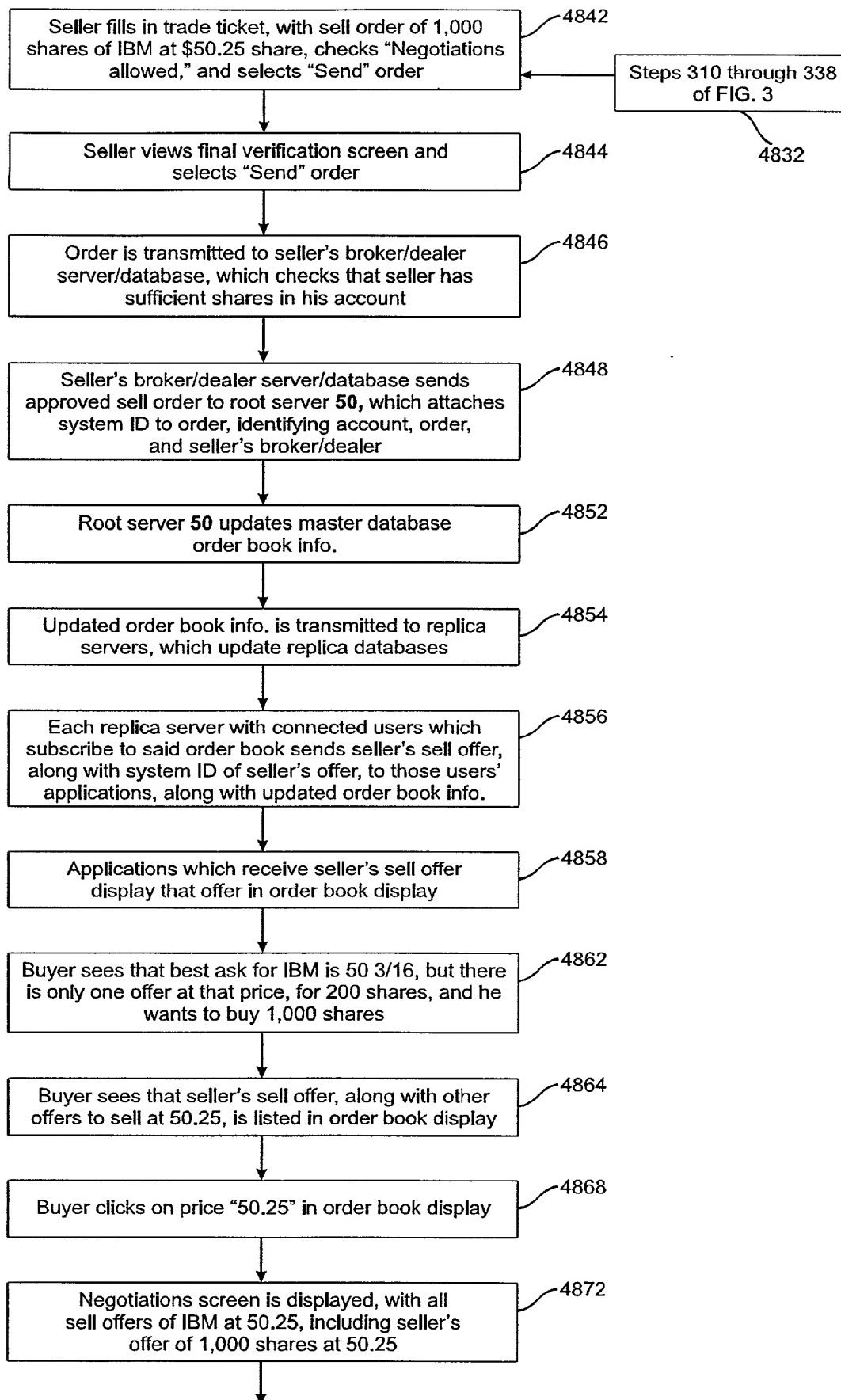


FIG. 48A

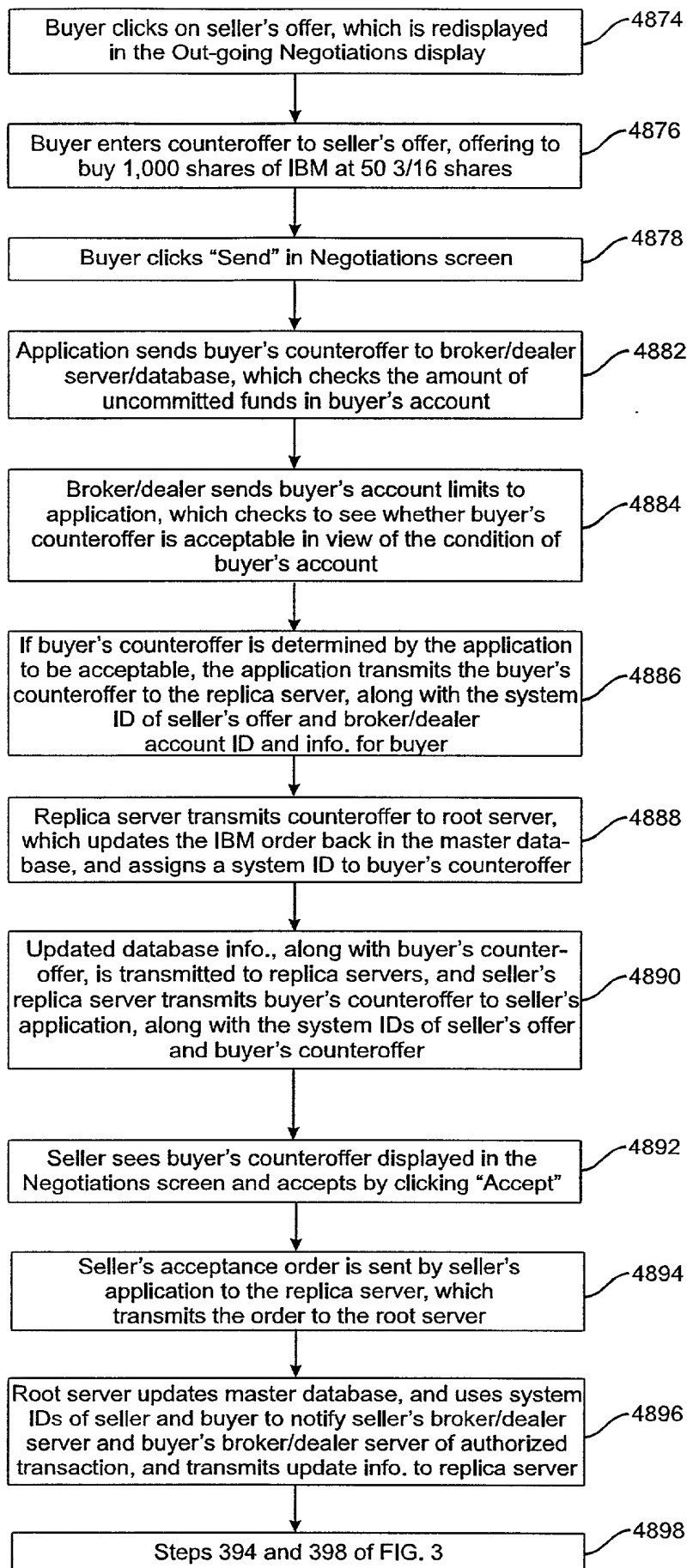
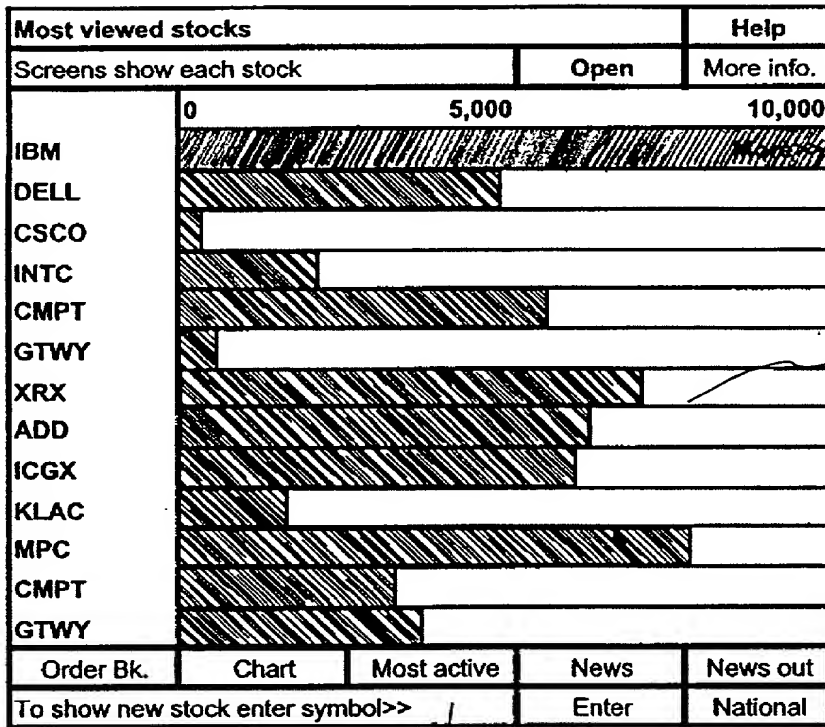


FIG. 48B



4910

4920

FIG. 49

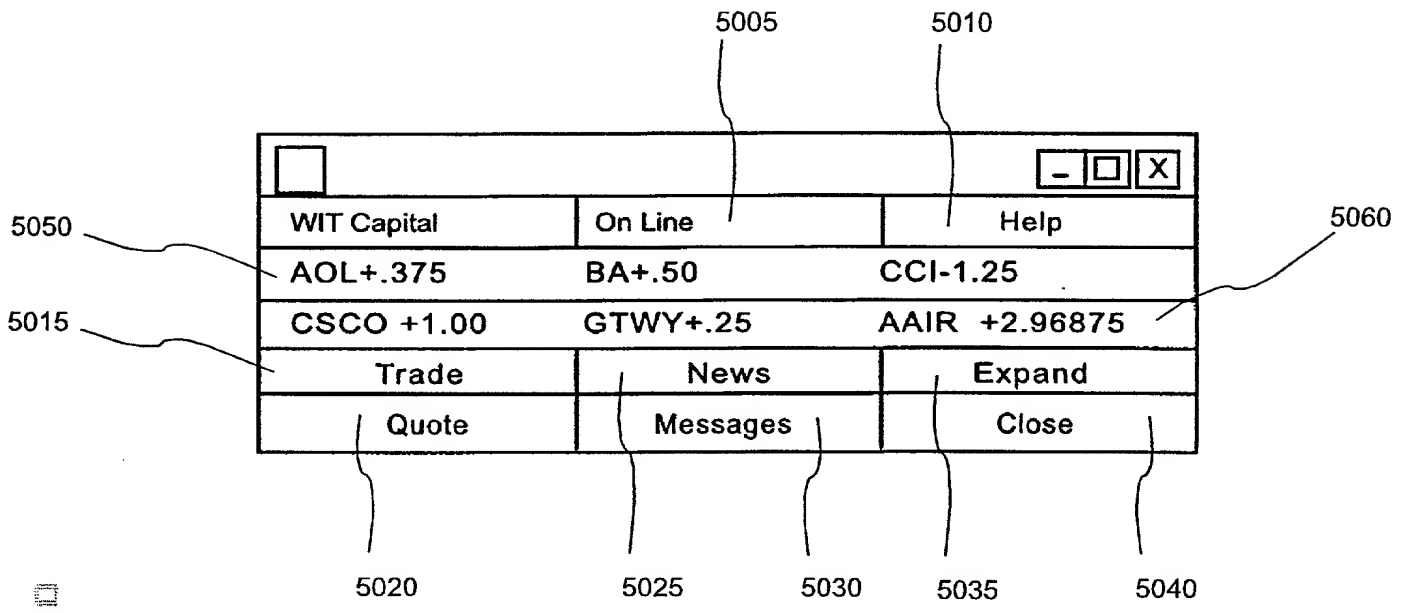


FIG. 50

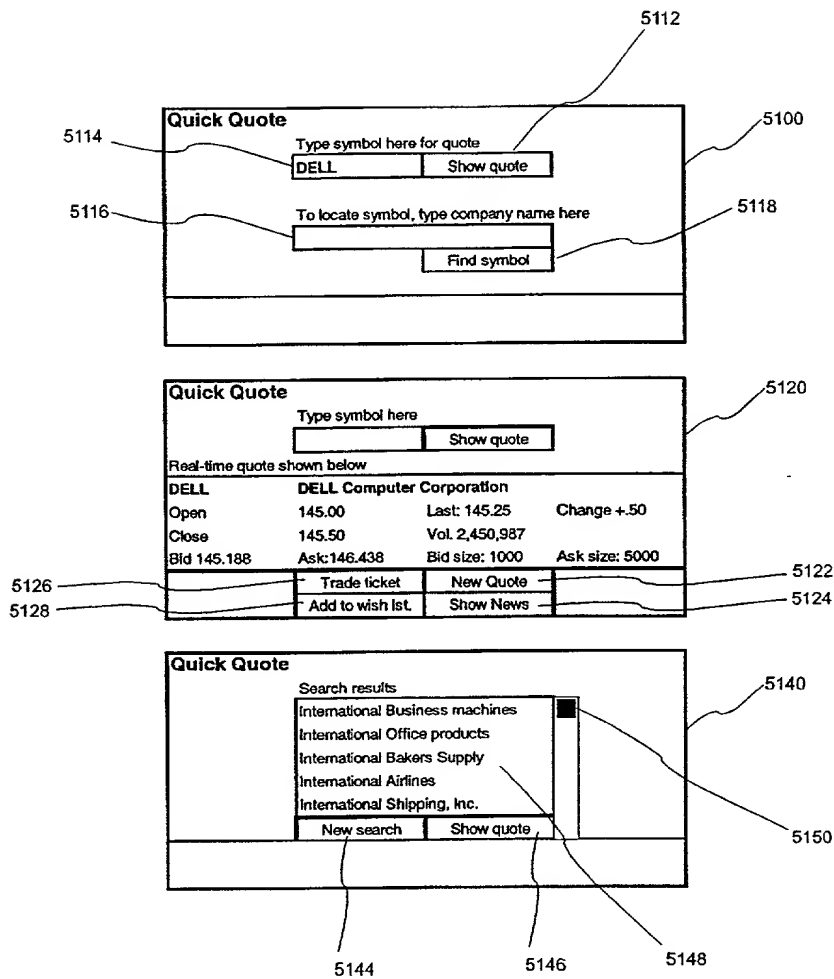


FIG. 51

5200

5220

5222

5210

5212

5215

5260

5230

5232

5234

5236

5240

5242

5244

5250

Stock alert set up			
		Symbol	DELL
Current price	Alert options	Enter your numbers below	
121	Pager <input type="checkbox"/>	1-917-564-9834	
Alert price	Email <input type="checkbox"/>	Dwilliams@AOL.com	
120 1/2	Fax <input type="checkbox"/>	1-212-253-4487	
Other criteria	Phone <input type="checkbox"/>	1-914-786-9087	
Type of alert	New alert	Clear alert	OK

FIG. 52



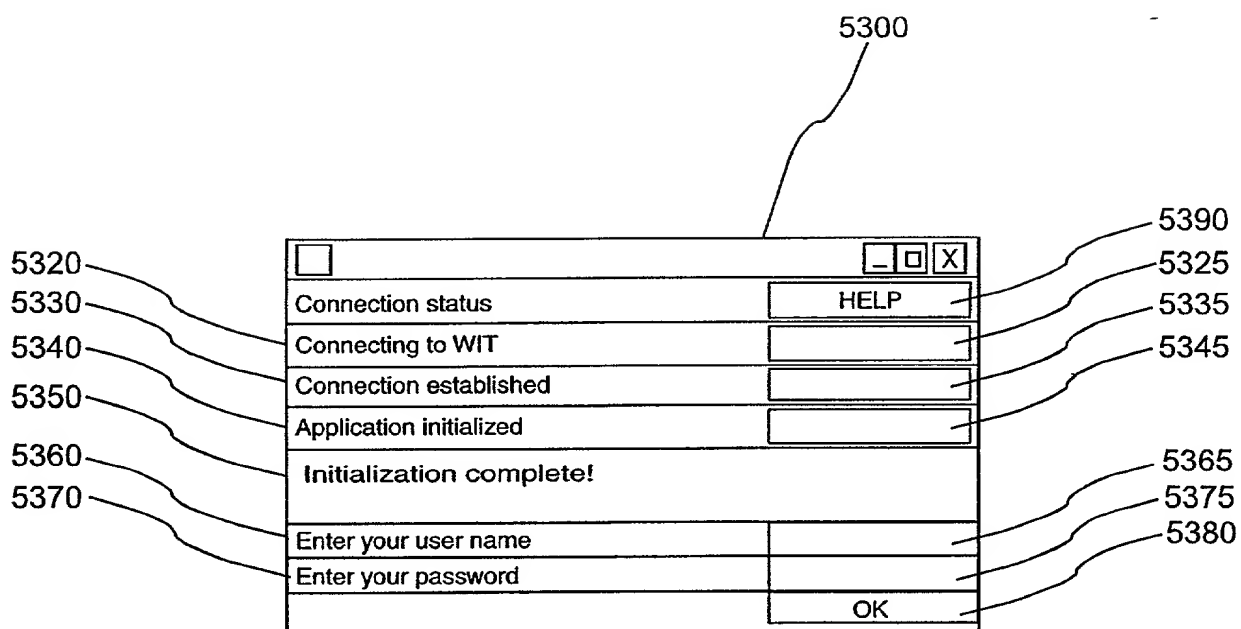


FIG. 53

		Buy		Price 1/16	Sell			
		AON Qty.	Limit Qty.	Decimals	Limit Qty.	AON Qty.		
				147.188	10		148	
				147.125			147	
				147.063	543			
				147				
				146.938	578		146	
				146.875	4474			
				146.8125	4376			
9000				3.875		7500	145	
		342		143.813				
		10		143.75				
				143.688			144	
		55		143.625				
				143.562				
		25		143.5			143	
		10		143.438				
		5		143.375				
		5		143.313				

FIG. 54

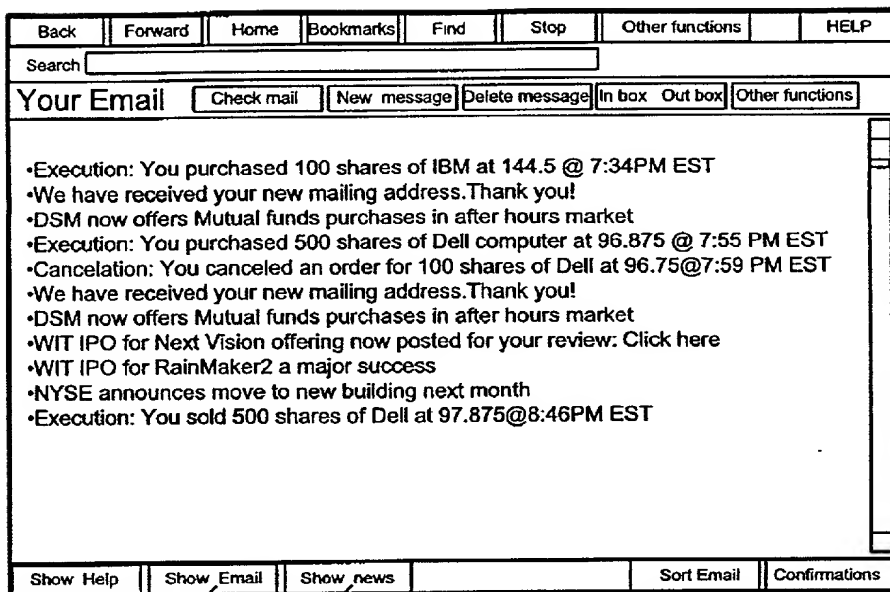


FIG. 55

5670

5640

5650

FINAL VERIFICATION			
BUY ORDER: DELL COMPUTER			
National Market			
This is a final verification that you wish to execute this trade.			
Please note the final real-time quote shown below.			
Action	Quantity	Symbol	Price Type
BUY	1000	DELL	Stop/Limit
Limit Price	Stop Price	Ref. 4539	
145.438	145.5		
Duration	Condition	Account	Route
DAY	AON	CASH	National
Real-time quote shown below			
Open	145.00	Last: 145.25	Change +.50
Close	145.50	Vol. 2,450,987	
Bid 145.188	Ask: 146.438	Bid size: 1000	Ask size: 5000
Your current buying power is:			\$156,876.99
If you execute this trade your balance will be:			\$136,876.54
If you execute this trade your commission will be:			\$76.54
The total cost including commission will be:			\$20,076.99
Show DSM		Cancel	Send
Clear		Hide details	

5610

5630

5620

FIG. 56

5710

	Help		
\$	More info.		
148	1	2	3
147			
146			
145			
144			
143			
Stock: DELL			
Quantity: 500			
Best price please			
Market 1			
400 @ 144.875			

5740

5730

5720

FIG. 57

Most active stocks				After hours mkt. is open			
Day market		Nite Market					
IBM + 2.55 / 105.75		IBM + .95 / 105.75-News					
DELL+ 2.25 / 78.5		DELL+ .87 / 78.5					
T+ 1.75 / 99.25		CSCO+ .75 / 45.87-News					
CSCO+ 1.75 / 45.87		INTC+ .70 / 111.75					
INTC+ 1.70 / 111.75		CMPT-.65 / 78.00					
CMPT+1.25 / 78.00		GTWY+.62 / 75.75					
GTWY+1.22 / 75.75		XRX+.52 / 75.75					
HP+1.05 / 58.25		ADD-.45 / 58.25-News					
ICGX+1.00 / 90.375		ICGX-.38 / 90.375-News					
KLAC+.98 / 43.75		KLAC+.38 / 43.75					
FMC+.95 / 56.00		MPC-.25 / 56.00					
DOW +1.98 / 8976.87							
Nasdaq+1.25 / 10979		More stocks below					
Your pos. \$143.50							
P&L+\$4,568							
Overall P&L +19%							
Price map scale							
Order Bk.	Chart	Most active	Show news	News out	Day Mkt.	Nite Mkt.	Buy
To show new stock enter symbol>>			Symbol	Movement UP	Compress spread		Sell

FIG. 57A

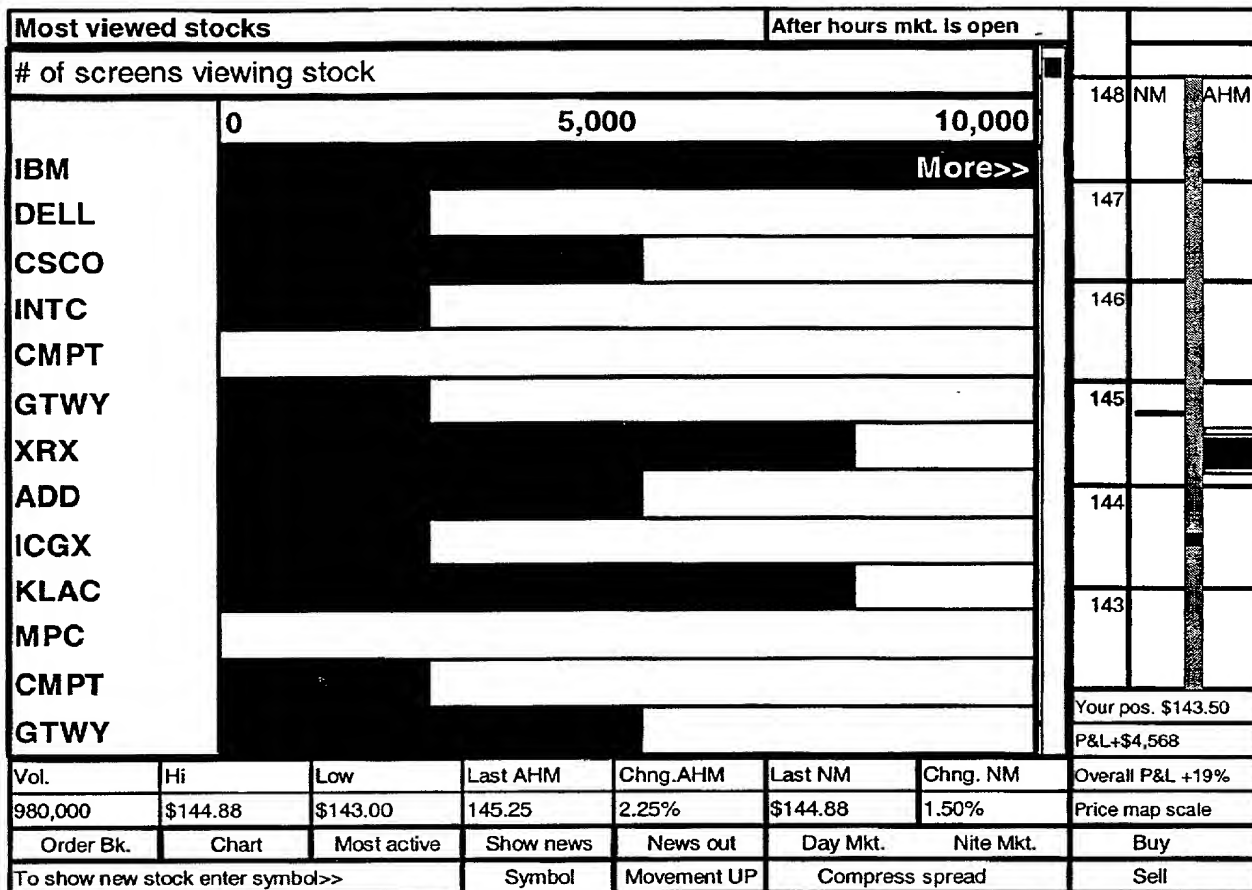


FIG. 57B

Chart of trading activity						After hours mkt. is open				
Stock B								148	NM	AHM
Buy side		Price in 5/16		Sell side						
Your orders	ACN Qty	Limit Qty	Decimals	Limit Qty	ACN Qty	Your orders				
<div>Stock B</div>								147		
								146		
								145		
								144		
								143		
								Your pos: \$143.30		
								PEL=\$4.568		
Vol	I=	Low	Last AHM	Chng AHM	Last NM	Chng NM	Overall PEL + 19%			
980,000	\$144.88	\$143.00	145.25	2.25%	\$144.88	+1.50%	Price map scale			
Order Bk	Chart	Most active	Show news	News out	Day Mkt	Nite Mkt	Buy			
To show new stock enter symbol>>			Symbol	Movement UP	Compress spread	Sell				

Chart of trading activity						After hours mkt. is open									
Stock D															
Buy side			Price in 1/16			Sell side			148 NM		AHM				
Your orders	ACN Qty	Limit Qty	Decimals	Limit Qty	ACN Qty	Your orders									
<div>Stock D</div>														147	
														146	
														145	
														144	
														143	
												Your pos. \$143.99			
P&L=\$4.568															
Vol	Ht	Low	Last AHM	Chng AHM	Last NM	Chng NM	Overan P&L +19%								
980,000	\$144.88	\$143.00	145.25	2.25%	\$144.88	1.50%	Price map scale								
Order Bk.	Chart	Most active	Show news	News out	Day Mkt.	Nite Mkt.	Buy								
To show now stock enter symbols>			Symbol	Movement UP	Compress spread		Sell								

FIG. 57C



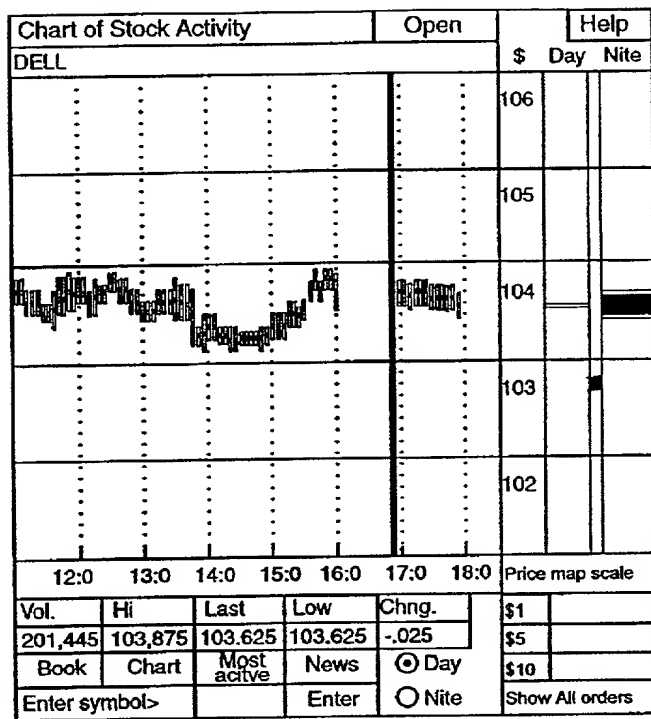


FIG. 58

Most Active Stocks				Open		Help	
Day at close		Nite most active		\$		Day	Nite
AOL	169.75	AOL	169.75	▲	55		
DELL	52.875	DELL	52.875				
MSFT	123.5625	MSFT	123.5625		54		
IBM	105.75	IBM	144.5 News				
T	99.25	INTC	111.75 News		53		
INTC	111.75	CMPT	78.00				
CMPT	78.00	GTWY	75.75		52		
GTWY	75.75	XRX	75.75				
HP	58.25	ADD	58.25 News		51		
ICGX	90.375	ICGX	90.375 News				
KLAC	43.75	KLAC	43.75		DELL		
FMC	56.00	MPC	56.00 News				
				▼	\$1		
				More Below ▼			
					\$5		
Book	Chart	Most active	News	<input checked="" type="radio"/> Day		\$10	
Enter symbol▶		DELL	Enter	<input type="radio"/> Nite		Show All orders	

FIG. 59

Most Viewed Stocks					Open		Help	
	# of screens showing each stock					\$	Day	Nite
IBM DELL CSCO INTC CMPT GTWY XRX ADD ICGX KLAC MPC CMPT GTWY	0	5,000	10,000	More>>	▲	55		
						54		
						53		
						52		
						51		
					▼	Price map scale		
	Vol.	Hi	Last	Low	Chng.	\$1		
	1,000	53	51.625	51.625	-.0625	\$5		
	Book	Chart	Most active	News	⊙Day ○Night	\$10		
Enter symbol>		DELL	Enter	Show All orders				

FIG. 60

After Hours Order Book					Open		Help	
DELL					\$		Day	Nite
BUY AON	BUY Limit	Price 1/16	SELL Limit	SELL AON		55		
		53	100	500	▲			
		52.9375	500	1000				
		52.875	400	500		54		
		52.8125	400					
	100	52.75						
		52.6875				53		
	100	52.625						
	100	52.562						
		52.5						
		52.4375				52		
	800	52.375						
		52.3125						
	100	52.25				51		
		52.1875						
	400	52.125						
		52.0625						
	200	52			▼	Price map scale		
Vol.	Hi	Last	Low	Chng.		\$1		
1,000	53	51.625	51.625	-.0625		\$5		
Book	Chart	Most active	News	⊙Day		\$10		
Enter symbol>	DELL	Enter		○Night		Show All orders		

FIG. 61

Back	Forward	Home	Find	Stop	Other functions	HELP	Help		
Search <input type="text"/>							\$	Day	Nite
DSM News							55		
<input type="button" value="Pre-opening"/> <input type="button" value="Opening bell"/> <input type="button" value="Hot Shots"/> <input type="button" value="News out"/> <input type="button" value="Closing bell"/>							54		
<b>Hot Shots</b> news on the current 24 most active stocks  7:37pm EST: reported by Amy Cortese DMS news service  *IBM Reports earnings up 22% over same period last year. *DELL In after hours news, reports earnings up 42% over last year same quarter *CMPT In after hours news, reports launch of new direct sales plan for internet *XRK Rumors Xerox has received patent for super high resolution display *HP In after hours announcement, HP reports 34% decline in sales for 2nd qtr. *T Rumors of joint venture with IBM on wireless internet service *CCI In after hours news, reports earnings up 56% over last year same quarter *BA No news *CSGO Rumors Xerox has received patent for super high resolution display *RJR In after hours announcement, reports 31% decline in sales for 2nd qtr. *MCI Rumors of joint venture with @ Home on Cable modem trading system *FRP No news *GM Reports 8% loss for quarter							53		
							52		
							51		
							Price map scale		
<input type="button" value="Show Help"/> <input type="button" value="Show Email"/> <input type="button" value="Show news"/> <input type="button" value="Show Chart"/> <input type="button" value="Sort news"/> <input type="button" value="Show my stks"/>							\$1		
1,000 53 51.625 51.625 -.0625							\$5		
Book Chart Most active News <input checked="" type="radio"/> Day							\$10		
Enter symbol> DELL Enter <input type="radio"/> Night							Show All orders		

FIG. 62

# DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below at 201 et seq. underneath my name.

I believe I am the original, first and sole inventor if only one name is listed at 201 below, or an original, first and joint inventor if plural names are listed at 201 et seq. below, of the subject matter which is claimed and for which a patent is sought on the invention entitled

"COMPUTER TRADING SYSTEM, METHOD, AND INTERFACE"

and for which a patent application:

- ☒ is attached hereto and includes amendment(s) filed on *(if applicable)*  
☐ was filed in the United States on \_\_\_\_\_ as Application No. \_\_\_\_\_ *(for declaration not accompanying application)*  
 with amendment(s) filed on *(if applicable)*  
☐ was filed as PCT international Application No. \_\_\_\_\_ on \_\_\_\_\_ and was amended under PCT Article 19 on *(if applicable)*

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

EARLIEST FOREIGN APPLICATION(S), IF ANY, FILED PRIOR TO THE FILING DATE OF THE APPLICATION			
APPLICATION NUMBER	COUNTRY	DATE OF FILING (day, month, year)	PRIORITY CLAIMED
None			YES <input type="checkbox"/> NO <input type="checkbox"/>
			YES <input type="checkbox"/> NO <input type="checkbox"/>

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

APPLICATION NUMBER	FILING DATE
60/122,208	MARCH 1, 1999

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION SERIAL NO.	FILING DATE	STATUS		
		PATENTED	PENDING	ABANDONED
None				

POWER OF ATTORNEY: As a named inventor, I hereby appoint S. Leslie Misrock (Reg. No. 18872), Harry C. Jones, III (Reg. No. 20280), Berj A. Terzian (Reg. No. 20060), Gerald J. Flintoft (Reg. No. 20823), David Weild, III (Reg. No. 21094), Jonathan A. Marshall (Reg. No. 24614), Barry D. Rein (Reg. No. 22411), Stanton T. Lawrence, III (Reg. No. 25736), Charles E. McKenney (Reg. No. 22795), Philip T. Shannon (Reg. No. 24278), Francis E. Morris (Reg. No. 24615), Charles E. Miller (Reg. No. 24576), Gidon D. Stern (Reg. No. 27469), John J. Lauter, Jr. (Reg. No. 27814), Brian M. Poissant (Reg. No. 28462), Brian D. Coggio (Reg. No. 27624), Rory J. Radding (Reg. No. 28749), Stephen J. Harbulak (Reg. No. 29166), Donald J. Goodell (Reg. No. 19766), James N. Palik (Reg. No. 25510), Thomas E. Friebl (Reg. No. 29258), Laura A. Coruzzi (Reg. No. 30742), Jennifer Gordon (Reg. No. 30753), Jon R. Stark (Reg. No. 30111), Allan A. Fanucci (Reg. No. 30256), Geraldine F. Baldwin (Reg. No. 31232), Victor N. Balancia (Reg. No. 31231), Samuel B. Abrams (Reg. No. 30605), Steven I. Wallach (Reg. No. 35402), Marcia H. Sundeen (Reg. No. 30893), Paul J. Zegger (Reg. No. 33821), Edmond R. Bannon (Reg. No. 32110), Bruce J. Barker (Reg. No. 33291), Adriane M. Antler (Reg. No. 32605), Thomas G. Rowan (Reg. No. 34419), James G. Markey (Reg. No. 31636), Thomas D. Kohler (Reg. No. 32797), Scott D. Stimpson (Reg. No. 33607), William S. Galliani (Reg. No. 33885), Gary S. Williams (Reg. No. 31066), Mark A. Farley (Reg. No. 33170) and Ann L. Gisolfi (Reg. No. 31956), all of Pennie & Edmonds LLP, whose addresses are 1155 Avenue of the Americas, New York, New York 10036, 1667 K Street N.W., Washington, DC 20006 and 3300 Hillview Avenue, Palo Alto, CA 94304, and each of them, my attorneys, to prosecute this application, and to transact all business in the Patent and Trademark Office connected therewith.

**SEND CORRESPONDENCE TO:**

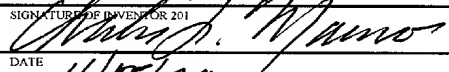
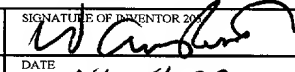
PENNIE & EDMONDS LLP  
1155 Avenue of the Americas  
New York, N.Y. 10036-2711

**DIRECT TELEPHONE CALLS TO:**

PENNIE & EDMONDS LLP DOCKETING  
(212) 790-9090

201	FULL NAME OF INVENTOR	LAST NAME MAURO	FIRST NAME CHARLES	MIDDLE NAME L.	
	RESIDENCE & CITIZENSHIP	CITY NEW YORK	STATE OR FOREIGN COUNTRY NEW YORK	COUNTRY OF CITIZENSHIP U.S.A.	
	POST OFFICE ADDRESS	STREET 130 EAST 75TH STREET	CITY NEW YORK	STATE OR COUNTRY NEW YORK	ZIP CODE 10021
202	FULL NAME OF INVENTOR	LAST NAME KLEIN	FIRST NAME ANDREW	MIDDLE NAME D.	
	RESIDENCE & CITIZENSHIP	CITY NEW YORK	STATE OR FOREIGN COUNTRY NEW YORK	COUNTRY OF CITIZENSHIP U.S.A.	
	POST OFFICE ADDRESS	STREET 70 EAST 10TH STREET	CITY NEW YORK	STATE OR COUNTRY NEW YORK	ZIP CODE 10003
203	FULL NAME OF INVENTOR	LAST NAME BUIST	FIRST NAME WALTER	MIDDLE NAME D.	
	RESIDENCE & CITIZENSHIP	CITY HASBROUCK	STATE OR FOREIGN COUNTRY NEW JERSEY	COUNTRY OF CITIZENSHIP U.S.A.	
	POST OFFICE ADDRESS	STREET 405 SPRINGFIELD AVENUE	CITY HASBROUCK	STATE OR COUNTRY NEW JERSEY	ZIP CODE 07604
204	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	STREET	CITY	STATE OR COUNTRY	ZIP CODE
205	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	STREET	CITY	STATE OR COUNTRY	ZIP CODE
206	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	STREET	CITY	STATE OR COUNTRY	ZIP CODE

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201 	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203 
DATE 4/15/99	DATE	DATE 4/15/99
SIGNATURE OF INVENTOR 204	SIGNATURE OF INVENTOR 205	SIGNATURE OF INVENTOR 206
DATE	DATE	DATE